F-8-E-14

MACHINERY & SUPPLIES

MASSCO

CATALOG № 92

The MINE AND SMELTER SUPPLY COMPANY
DENVER-SALT LAKE CITY-EL PASO
NEW YORK

392
518
560
73
153 writing

425 shovels
503 grease can

Catalog No. 92

Supplies & Equipment

For

Industrials, Contractors,
Railroads, Utilities,
Municipalities,
The Mining Industry

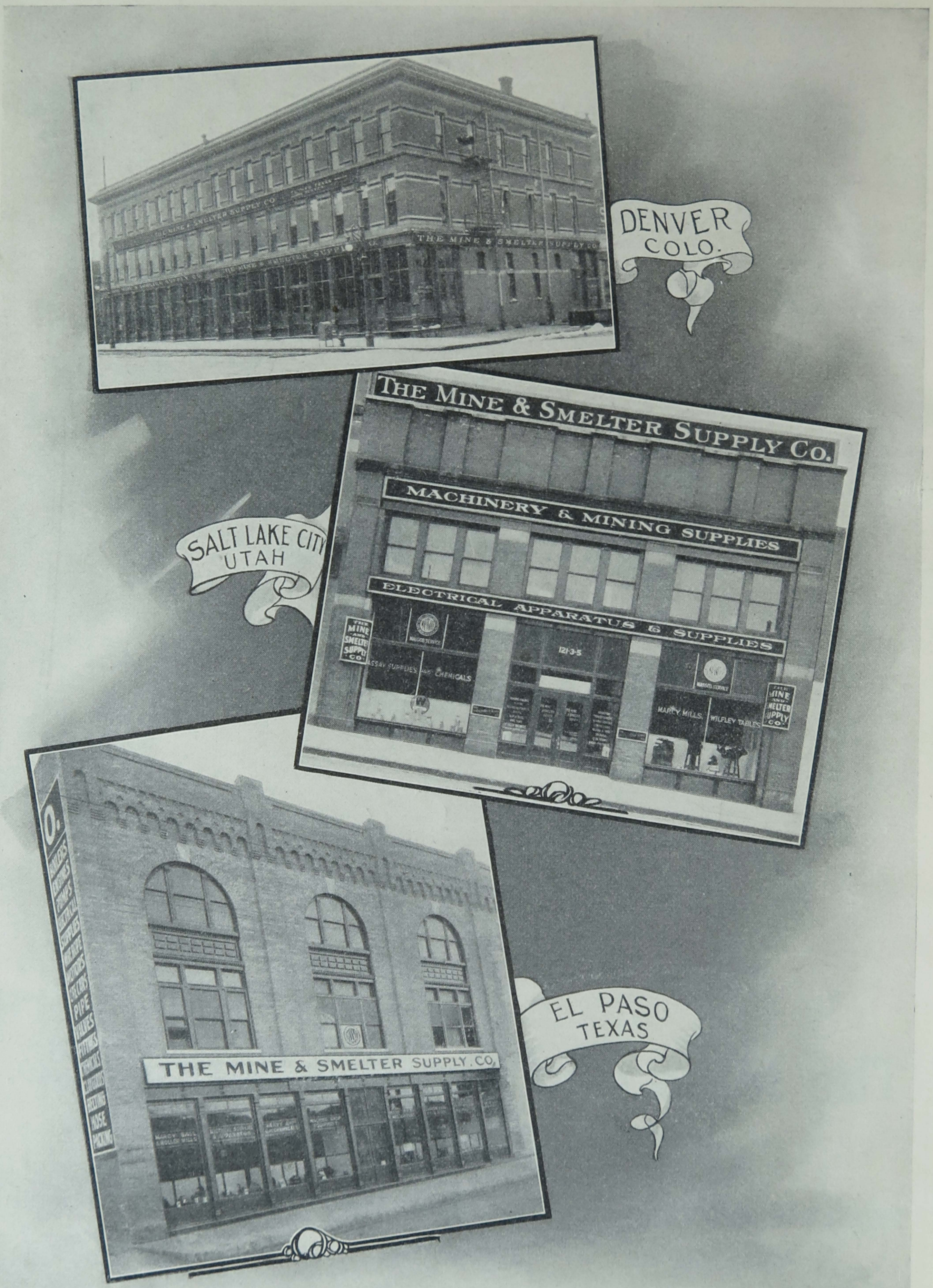
●

The Mine and Smelter Supply Co.
17th and Blake, Denver, Colo.

410-412 San Francisco
El Paso, Tex.

1775 Broadway
New York

121 W. Second South
Salt Lake City


DENVER
COLO.
THE MINE & SMELTER SUPPLY CO.
SALT LAKE CITY
UTAH
THE MINE & SMELTER SUPPLY Co.
MACHINERY & MINING SUPPLIES
ELECTRICAL APPARATUS & SUPPLIES
ASSAY SUPPLIES AND CHEMICALS
121-3-5
MARCY MILLS. WILFLEY TABLES
THE MINE AND SMELTER SUPPLY CO.
EL PASO
TEXAS
THE MINE & SMELTER SUPPLY. CO.
PIPE
VALVES
FITTINGS
HOSE
PACKING

COPYRIGHT 1937 BY R. R. DONNELLEY & SONS CO.

MINE AND SMELTER WAREHOUSE FACILITIES

The MINE and SMELTER SUPPLY COMPANY
THE MINE & SMELTER SUPPLY CO.
MECHANICAL
ELECTRICAL
CHEMICAL
The MINE SUPPLY
WAREHOUSE

GENERAL INFORMATION

IN COMPILING this catalogue, we have endeavored to make it an up-to-date reference book of machinery and mill supplies. Owing to the large number of items shown, it is impossible to give full illustrations and descriptions, but we have special catalogues or bulletins on most of the machinery listed herein which will be gladly furnished upon request.

All quotations, contracts and sales made by us are subject to the following terms:

PRICES

The list prices shown in this catalogue are those in effect at the time of issue, but are subject to change without notice. Quotations, unless otherwise stated, are for immediate acceptance. It is our policy to always sell at the lowest prices consistent with quality and efficient service.

Stenographical and clerical errors are subject to correction.

ORDERS

When ordering by telegram, please give catalogue number—if shown, page reference, together with brief description. Cable address—"Minterply." Codes used—Western Union; Bentley's Bedford McNeill.

Mail orders should state catalogue number, page reference and full description to avoid delay. All agreements are made, and orders accepted, subject to contingencies such as strikes, fires, accidents, and causes beyond our control.

Orders placed with us are not subject to cancellation without first obtaining our written consent.

GUARANTEE

Defective goods furnished by us will be replaced f.o.b. factory. We will not be responsible for any damages or expenses occasioned by defective goods, and our liability in all cases is limited to the value of the goods furnished.

ROUTING INSTRUCTIONS

Full shipping instructions should accompany all orders. Buyers located off transportation lines should specify to what points goods are to be shipped, by what routing, and to what post office invoices and shipping papers should be mailed.

In the absence of shipping instructions, it is understood that we are to use our own judgment and are not liable for any excess shipping charges that may result from incomplete information.

LOSS AND DAMAGE IN TRANSIT

Goods furnished by us are carefully packed by competent and experienced packers and are shipped at the risk of the purchaser. We are not responsible for loss, damage, or delays in transit. If goods are received damaged or in bad order, endorsement should be made on the transportation company's receipt and claim promptly filed against them. Our Traffic Department will gladly assist you in securing adjustment of any such claims.

SHORTAGES

All shipments are double checked before leaving our shipping room to prevent errors and shortages. Claims for shortages must be filed with us within 10 days after receipt of shipment.

RETURNED GOODS

Written permission must first be obtained from us before returning goods for credit or exchange.

When permission is obtained be sure to clearly mark the package with your name and address and write us promptly, sending us the shipping receipt and stating the date of our invoice on which the goods were billed to you.

RESPONSIBILITY

All statistical information contained in this catalogue pertaining to Strength and Proper Working Loads of materials, tools, etc., is derived from tables compiled by the manufacturer thereof, and are reprinted by us for the convenience of the buyer.

It is our unswerving purpose to stock only the very best and most dependable merchandise. It must be understood, however, that all estimates of strength and effectiveness are necessarily based upon use under proper working conditions. Normal wear and deterioration due to age must also be recognized as operative from the time the material first goes into service.

We can accept no responsibility for DAMAGE resulting from failure of products furnished, unless we specifically accept responsibility at the time the order is placed.

Flats

O.H. Steel .15 to .20 Carbon

¼-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
⅜	$1.40	.319	1½	$.15	1.28	3¾	$.15	3.19
½	.90	.425	1¾	.15	1.49	4	.15	3.40
⅝	.60	.531	2	.15	1.70	4¼	.15	3.61
¾	.40	.638	2¼	.15	1.91	4½	.15	3.83
⅞	.30	.744	2½	.15	2.13	5	.15	4.25
1	.15	.85	2¾	.15	2.34	5½	.15	4.68
1⅛	.15	.956	3	.15	2.55	6	.15	5.10
1¼	.15	1.06	3¼	.15	2.76	...	...	....
1⅜	.15	1.17	3½	.15	2.98	...	...	....

5/16-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
½	$.90	.531	1½	$.15	1.59	3½	$.15	3.72
⅝	.60	.664	1¾	.15	1.86	4	.15	4.25
¾	.40	.797	2	.15	2.13	4½	.15	4.78
⅞	.30	.93	2¼	.15	2.39	5	.15	5.31
1	.15	1.06	2½	.15	2.66	5½	.15	5.84
1⅛	.15	1.20	2¾	.15	2.92	6	.15	6.38
1¼	.15	1.33	3	.15	3.19	...	...	....
1⅜	.15	1.46	3¼	.15	3.45	...	.	....

⅜-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
½	$.70	.638	1½	Base	1.91	3¼	Base	4.14
⅝	.40	.797	1⅝	Base	2.07	3½	Base	4.46
¾	.30	.956	1¾	Base	2.23	4	Base	5.10
⅞	.20	1.12	2	Base	2.55	4½	Base	5.74
1	Base	1.28	2¼	Base	2.87	5	Base	6.38
1⅛	Base	1.43	2½	Base	3.19	5½	Base	7.01
1¼	Base	1.59	2¾	Base	3.51	6	Base	7.65
1⅜	Base	1.75	3	Base	3.83	...	...	....

7/16-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
¾	$.30	1.12	2	Base	2.98	4	Base	5.95
⅞	.20	1.30	2¼	Base	3.35	4½	Base	6.70
1	Base	1.49	2½	Base	3.72	5	Base	7.44
1¼	Base	1.86	2¾	Base	4.09	5½	Base	8.18
1⅜	Base	2.05	3	Base	4.46	6	Base	8.93
1½	Base	2.23	3¼	Base	4.83	...	....	....
1¾	Base	2.60	3½	Base	5.21	...	....	....

½-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
⅝	$.40	1.06	1⅝	Base	2.76	3½	Base	5.95
¾	.30	1.28	1¾	Base	2.98	4	Base	6.80
⅞	.20	1.49	2	Base	3.40	4½	Base	7.65
1	Base	1.70	2¼	Base	3.83	5	Base	8.50
1⅛	Base	1.91	2½	Base	4.25	5½	Base	9.35
1¼	Base	2.13	2¾	Base	4.68	6	Base	10.20
1⅜	Base	2.34	3	Base	5.10	...	...	.....
1½	Base	2.55	3¼	Base	5.53	...	...	.....

⅝-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
¾	$.30	1.59	1⅝	Base	3.45	3¼	Base	6.91
⅞	.20	1.86	1¾	Base	3.72	3½	Base	7.44
1	Base	2.13	2	Base	4.25	4	Base	8.50
1⅛	Base	2.39	2¼	Base	4.78	4½	Base	9.56
1¼	Base	2.66	2½	Base	5.31	5	Base	10.63
1⅜	Base	2.92	2¾	Base	5.84	5½	Base	11.69
1½	Base	3.19	3	Base	6.38	6	Base	12.75

¾-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
⅞	$.20	2.23	2	Base	5.10	4	Base	10.20
1	Base	2.55	2¼	Base	5.74	4½	Base	11.48
1⅛	Base	2.87	2½	Base	6.38	5	Base	12.75
1¼	Base	3.19	2¾	Base	7.01	5½	Base	14.03
1½	Base	3.83	3	Base	7.65	6	Base	15.30
1⅝	Base	4.15	3¼	Base	8.29	...	....	.....
1¾	Base	4.46	3½	Base	8.93	...	....	.....

⅞-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
1	Base	2.98	2¼	Base	6.69	4½	Base	13.39
1¼	Base	3.72	2½	Base	7.44	5	Base	14.88
1⅜	Base	4.09	2¾	Base	8.18	5½	Base	16.36
1½	Base	4.46	3	Base	8.93	6	Base	17.85
1¾	Base	5.21	3½	Base	10.41	...	....	.....
2	Base	5.95	4	Base	11.90	...	....	.....

1-Inch

Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs per Ft.
1¼	Base	4.25	2¾	Base	9.35	5	Base	17.00
1½	Base	5.10	3	Base	10.20	5½	Base	18.70
1¾	Base	5.95	3¼	Base	11.05	6	Base	20.40
2	Base	6.80	3½	Base	11.90	...	.....	.....
2¼	Base	7.65	4	Base	13.60	...	.....	.....
2½	Base	8.50	4½	Base	15.30	...	.....	.....

Flats

O. H. Steel .15 to .20 Carbon

Continued

1¼-Inch

Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
1½	$.10	6.38	2¾	$.10	11.60	4½	$.20	19.13
1¾	.10	7.44	3	.10	12.75	5	.20	21.25
2	.10	8.50	3¼	.15	13.81	5½	.20	23.38
2¼	.10	9.56	3½	.15	14.88	6	.20	25.50
2½	.10	10.63	4	.20	17.00	...	...	.....

1½-Inch

Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
2	$.10	10.20	3½	$.15	17.85	5	$.20	25.50
2½	.10	12.75	4	.20	20.40	5½	.20	28.05
3	.10	15.30	4½	.20	22.95	6	.20	30.60

1¾-Inch

Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
2	$.10	11.90	3½	$.15	20.83	5	$.20	29.75
2½	.10	14.88	4	.20	23.80	5½	.20	32.73
3	.10	17.85	4½	.20	26.78	6	.20	35.70

2-Inch

Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
2½	$.10	17.00	4	$.20	27.20	6	$.20	40.80
3	.10	20.40	4½	.20	30.60	...	...	.....
3½	.10	23.80	5	.20	34.00	...	...	.....

2½-Inch

Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
3	$.25	25.50	4	$.25	34.00	5	$.25	42.50
3½	.25	29.75	4½	.25	38.26	6	.30	51.00

3-Inch

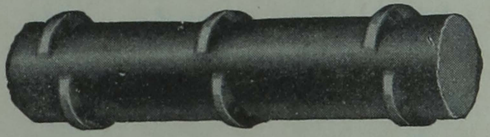
Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
4	$.25	40.80	5	$.25	51.00	...	...	.....
4½	.25	45.90	6	.30	61.20	...	...	.....

4-Inch

Size In.	Net Extra for Size	Wt. Lbs per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.	Size In.	Net Extra for Size	Wt. Lbs. per Ft.
6	$3.00	81.6	...	...	.....	...	...	.....

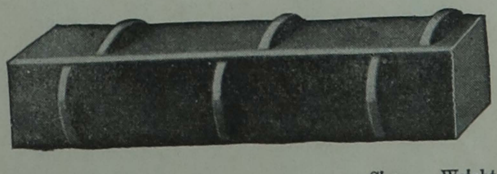
Concrete Reinforcing Bars

Deformed Rounds



Size In.	Size Extra per Lb.	Weight per Foot Lbs.	Area Square In.	Size In.	Size Extra per Lb.	Weight per Foot Lbs.	Area Square In.
⅜	$.40	.376	.11	¾	Base	1.502	.44
½	.20	.668	.19	⅞	Base	2.044	.60
⅝	.10	1.043	.30	1	Base	2.670	.78

Deformed Squares



Size In.	Size Extra per Lb.	Weight per Foot Lbs.	Area Square In.	Size In.	Size Extra per Lb.	Weight per Foot Lbs.	Area Square In.
½	$.20	.850	.25	1⅛	Base	4.303	1.26
1	Base	3.400	1.00	1¼	Base	5.313	1.55

Reinforcing Bars Cut and Formed

In addition to furnishing random length bars, we will cut and form to your specifications.

In ordering cut and formed steel we recommend your sending us blueprints of the job requirements.

Bands Soft O. H. Steel

In straight lengths.

B. W. Ga. and Size in Inches	Net Extra for Size	Weight Pounds Per Ft.	B. W. Ga. and Size in Inches	Net Extra for Size	Weight Pounds Per Ft.
12x ⅜	$1.70	0.139	10x1½	.35	0.683
½	1.20	0.185	1¾	.35	0.797
⅝	.85	0.232	2	.35	0.911
¾	.70	0.278	2¼	.30	1.025
⅞	.60	0.324	2½	.30	1.139
1	.50	0.371	2¾	.25	1.253
1⅛	.50	0.417	3	.25	1.367
1¼	.50	0.463	3¼	.20	1.481
1⅜	.50	0.510	3½	.20	1.595
1½	.40	0.556	4	.20	1.822
1¾	.40	0.649	4½	.15	2.050
2	.40	0.741	5	.15	2.278
2¼	.35	0.834	5½	.15	2.506
2½	.35	0.927	6	.15	2.734
2¾	.30	1.019	7	.10	3.189
3	.30	1.112	8	.10	3.645
3½	.25	1.297	9	.10	4.100
4	.25	1.482	3-16x⅜	1.45	0.239
1-8x ⅜	1.60	0.159	½	1.05	0.319
½	1.10	0.213	⅝	.70	0.398
⅝	.75	0.266	¾	.55	0.478
¾	.60	0.319	⅞	.45	0.558
⅞	.50	0.372	1	.35	0.638
1	.40	0.425	1⅛	.35	0.717
1⅛	.40	0.477	1¼	.35	0.797
1¼	.40	0.531	1⅜	.35	0.877
1⅜	.40	0.584	1½	.30	0.956
1½	.35	0.638	1¾	.30	1.12
1¾	.35	0.744	2	.30	1.28
2	.35	0.850	2¼	.25	1.43
2¼	.30	0.956	2½	.25	1.59
2½	.30	1.063	2¾	.20	1.75
2¾	.25	1.169	3	.20	1.91
3	.25	1.275	3¼	.15	2.07
3½	.20	1.488	3½	.15	2.23
4	.20	1.700	4	.15	2.55
4½	.15	1.913	4½	.10	2.87
5	.15	2.125	5	.10	3.19
5½	.15	2.338	5½	.10	3.51
6	.15	2.550	6	.10	3.83
7	.10	2.975	7	.05	4.46
8	.10	3.400	8	.05	5.10
10x ⅜	1.60	0.171	9	.05	5.74
½	1.10	0.228	10	.05	6.38
⅝	.75	0.285	12	.05	7.65
¾	.60	0.342	14	Base	8.93
⅞	.50	0.399	15	Base	9.56
1	.40	0.456	16	Base	10.20
1⅛	.40	0.513	18	Base	11.48
1¼	.40	0.570	20	Base	12.75
1⅜	.40	0.627	22	Base	14.03

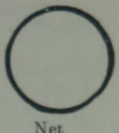
Hoops Soft O. H. Steel

22x ½	$3.25	.0476	18x2	$.60	.3332
⅝	2.35	.0595	2½	.70	.4165
¾	1.85	.0714	2¾	.70	.4582
⅞	1.55	.0833	3	.70	.4998
1	1.45	.0952	16x ⅜	2.40	.0829
1¼	1.45	.1190	½	1.55	.1105
1½	1.35	.1428	⅝	1.05	.1381
20x ½	2.35	.0595	¾	.90	.1658
⅝	1.65	.0744	⅞	.80	.1934
¾	1.35	.0893	1	.65	.2210
⅞	1.05	.1041	1⅛	.65	.2486
1	.95	.1190	1 ¼	.65	.2763
1 ⅛	.95	.1339	1 ½	.50	.3315
1 ¼	.95	.1488	1 ¾	.50	.3868
1 ½	.90	.1785	2	.50	.4420
19x ½	2.15	.0714	2 ¼	.45	.4973
⅝	1.45	.0893	2 ½	.45	.5525
¾	1.15	.1071	2 ¾	.45	.6078
⅞	.95	.1250	3	.45	.6630
1	.85	.1428	14x ½	1.35	.1411
1 ⅛	.85	.1607	⅝	.95	.1764
1 ¼	.85	.1785	¾	.85	.2117
1 ½	.70	.2142	⅞	.70	.2469
1 ¾	.70	.2499	1	.60	.2822
18x ½	1.95	.0833	1 ⅛	.60	.3175
⅝	1.25	.1041	1 ¼	.60	.3528
¾	1.05	.1250	1 ½	.45	.4233
⅞	.90	.1458	1 ¾	.45	.4939
1	.75	.1666	2	.45	.5644
1 ⅛	.75	.1874	2 ¼	.40	.6350
1 ¼	.75	.2083	2 ½	.40	.7055
1 ½	.60	.2499	2 ¾	.35	.7761
1 ¾	.60	.2916	3	.35	.8466

Straightening and cutting to special lengths subject to extras. Hooks and bands galvanized on special order.

Rounds

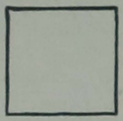
O. H. Steel .15 to .20 Carbon



Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.
3/16	$2.00	.094	1⅝	$.10	7.05	4¼	$.25	48.23
¼	1.00	.167	1¾	.10	8.18	4⅜	.25	51.11
5/16	.70	.261	1⅞	.10	9.39	4½	.25	54.08
⅜	.40	.376	2	.10	10.68	4⅝	.35	57.12
7/16	.30	.511	2⅛	.15	12.06	4¾	.35	60.25
½	.20	.668	2¼	.15	13.52	5	.35	66.76
9/16	.15	.845	2⅜	.15	15.06	5¼	.45	73.60
⅝	.10	1.04	2½	.15	16.69	5½	.45	80.78
11/16	.10	1.26	2⅝	.20	18.40	5¾	.55	88.29
¾	Base	1.50	2¾	.20	20.20	6	.55	96.13
13/16	Base	1.76	2⅞	.20	22.07	6⅛	.65	100.18
⅞	Base	2.04	3	.20	24.03	6¼	.65	104.31
15/16	Base	2.35	3⅛	.25	26.08	6½	.65	112.82
1	Base	2.67	3¼	.25	28.21	6⅝	.75	117.20
1 1/16	Base	3.01	3⅜	.25	30.42	6¾	.75	121.67
1⅛	Base	3.38	3½	.25	32.71	7	.75	130.85
1¼	Base	4.17	3⅝	.25	35.09	7⅛	.75	135.56
1 5/16	Base	4.60	3¾	.25	37.55	7¼	.75	140.36
1⅜	Base	5.05	4	.25	42.73	7½	.75	150.21
1½	Base	6.01	4⅛	.25	45.44	8	1.10	170.90

Squares

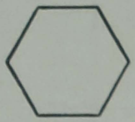
O. H. Steel .15 to .20 Carbon



Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.
¼	$1.00	.213	1	Base	3.40	2⅝	$.20	23.43
5/16	.70	.332	1⅛	Base	4.30	2¾	.20	25.71
⅜	.40	.478	1¼	Base	5.31	3	.20	30.60
7/16	.30	.651	1⅜	Base	6.43	3¼	.25	35.91
½	.20	.85	1½	Base	7.65	3½	.25	41.65
9/16	.15	1.08	1⅝	$.10	8.98	3¾	.25	47.81
⅝	.10	1.33	1¾	.10	10.41	4	.25	54.40
11/16	.10	1.61	1⅞	.10	11.95	4½	.25	68.85
¾	Base	1.91	2	.10	13.60	5	.35	85.00
13/16	Base	2.24	2¼	.15	17.21	6	3.00	122.40
⅞	Base	2.60	2½	.15	21.25	...	.....	.....

Hexagons

Soft Bessemer



Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.
½	$.35	.736	1⅛	$.125	3.727	2	$.25	11.778
9/16	.35	.932	1¼	.125	4.601	2¼	.25	14.907
⅝	.20	1.150	1⅜	.125	5.567	2½	.25	18.403
¾	.125	1.656	1½	.125	6.625	2¾	.25	22.268
⅞	.125	2.254	1⅝	.25	7.775	3	.25	26.500
1	.125	2.945	1¾	.25	9.018	...	...	......
1 1/16	.125	3.324	1⅞	.25	10.352	...	...	......

Half Rounds

O. H. Steel .15 to .20 Carbon

Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.	Size In.	Net Extra for Size	Wt., Lbs. per Ft.
⅜	$1.50	.188	1	$.30	1.335	2	$.30	5.340
½	1.00	.334	1⅛	.30	1.690	2½	.30	8.345
⅝	.70	.522	1¼	.30	2.086	3	.30	12.015
¾	.50	.751	1½	.30	3.004	...	...	......
⅞	.50	1.022	1¾	.30	4.089	...	...	......

Prices for large forged bars and galvanizing on application. Free cutting quality in hexagons, 10 cents per 100 lbs. extra.

Angles—Bar Sizes

Angles 2x2x3/16 and Larger—A.S.T.M.—A-7-34 Minimum Tensile 60000 Lbs. per Sq. In.; Smaller, O.H. Steel .15 to .20 Carbon

Size Inches	Net Extra for Size	Weight Pounds per Ft.	Size Inches	Net Extra for Size	Weight Pounds per Ft.
½x ½x⅛	$2.20	.38	2 x1½x3/16	$.15	2.12
⅝x ⅝x⅛	1.50	.48	¼	.15	2.77
¾x ¾x⅛	.60	.59	2 x2 x⅛	.25	1.65
3/16	.45	.84	3/16	.15	2.44
⅞x ⅞x⅛	.40	.70	¼	.15	3.19
1 x ⅝x⅛	.60	.64	5/16	.15	3.92
1 x1 x⅛	.30	.80	⅜	.15	4.70
3/16	.25	1.16	½	.15	6.00
¼	.25	1.49	2¼x2¼x⅛	.25	1.86
1⅛x1⅛x⅛	.30	.91	3/16	.15	2.75
1¼x1¼x⅛	.30	1.01	¼	.15	3.62
3/16	.25	1.48	5/16	.15	4.50
¼	.25	1.92	2½x1½x3/16	.20	2.44
1⅜x ⅞x⅛	.40	.91	¼	.20	3.19
1½x1½x⅛	.25	1.23	2½x2 x⅛	.25	1.86
3/16	.15	1.80	3/16	.15	2.75
¼	.15	2.34	¼	.15	3.62
5/16	.15	2.86	5/16	.15	4.50
⅜	.15	3.35	⅜	.15	5.30
1¾x1¾x⅛	.25	1.44	½	.15	6.74
3/16	.15	2.12	2½x2½x⅛	.25	2.08
¼	.15	2.77	3/16	.15	3.07
5/16	.15	3.39	¼	.15	4.10
2 x1¼x3/16	.25	1.96	5/16	.15	5.00
¼	.25	2.55	⅜	.15	5.90
2 x1½x⅛	.25	1.44	½	.15	7.70

Angles—Structural

A.S.T.M.—A-7-34 Minimum Tensile 60000 Lbs. per Square Inch

Size Inches	Net Extra for Size	Weight Pounds per Ft.	Size Inches	Net Extra for Size	Weight Pounds per Ft.
3 x2 x3/16	$.35	3.0	4 x3½x¼	$.25	6.2
¼	Base	4.1	5/16	Base	7.7
5/16	Base	5.0	⅜	Base	9.1
⅜	Base	5.9	7/16	Base	10.6
3 x2½x¼	Base	4.5	½	Base	11.9
5/16	Base	5.6	4 x4 x¼	Base	6.6
⅜	Base	6.6	5/16	Base	8.2
½	Base	7.7	⅜	Base	9.8
½	Base	8.5	7/16	Base	11.3
3 x3 x⅛	$.50	2.5	½	Base	12.8
3/16	.35	3.7	⅝	Base	15.7
¼	Base	4.9	¾	Base	18.5
5/16	Base	6.1	4½x3 x⅜	Base	9.1
⅜	Base	7.2	5 x3 x¼	$.15	6.6
7/16	Base	8.3	5/16	Base	8.2
½	Base	9.4	⅜	Base	9.8
⅝	Base	11.5	7/16	Base	11.3
3½x2½x¼	Base	4.9	½	Base	12.8
5/16	Base	6.1	¾	Base	18.5
⅜	Base	7.2	5 x3½x5/16	Base	8.7
½	Base	9.4	⅜	Base	10.4
⅝	Base	11.5	7/16	Base	12.0
3½x3 x¼	Base	5.4	½	Base	13.6
5/16	Base	6.6	⅝	Base	16.8
⅜	Base	7.9	5 x4 x⅜	Base	11
½	Base	10.2	½	Base	14.5
3½x3½x¼	Base	5.8	⅞	Base	24.2
5/16	Base	7.2	5 x5 x⅜	Base	12.3
⅜	Base	8.5	½	Base	16.2
7/16	Base	9.8	⅝	Base	20
½	Base	11.1	¾	Base	23.6
⅝	Base	13.6	6 x3½x5/16	$.10	9.8
4 x3 x¼	Base	5.8	⅜	Base	11.7
5/16	Base	7.2	7/16	Base	13.5
⅜	Base	8.5	½	Base	15.3
7/16	Base	9.8	⅝	Base	18.9
½	Base	11.1	6 x4 x5/16	$.10	10.3
⅝	Base	13.6	⅜	Base	12.3
¾	Base	16.0	7/16	Base	14.3

Angles—Structural

Manufacturers' Standard Specifications and A. S. T. M. for Bridges

Size Inches	Net Extra for Size	Weight Pounds per Ft.	Size Inches	Net Extra for Size	Weight Pounds per Ft.
6x4x½	Base	16.2	7x4x⅜	$.10	13.6
9/16	Base	18.1	7/16	.10	15.7
⅝	Base	20.0	½	.10	17.9
¾	Base	23.6	⅝	.10	22.0
⅞	Base	27.2	8x4x½	.10	19.6
6x6x⅜	Base	14.9	8x6x½	.10	23.0
7/16	Base	17.2	¾	.10	33.8
½	Base	19.6	8x8x½	.10	26.4
9/16	Base	21.9	⅝	.10	32.7
⅝	Base	24.2	¾	.10	38.9
¾	Base	28.7	⅞	.10	45.0
⅞	Base	33.1	1	.10	51.0
1	Base	37.4	....	...	....

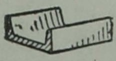
Galvanized Angles

Size Inches	Net Extra for Size	Weight Pounds per Ft.	Size Inches	Net Extra for Size	Weight Pounds per Ft.
½x ½x⅛	$2.20	.40	1¾x1¾x3/16	$.15	2.23
⅝x ⅝x⅛	1.50	.50	2 x1¼x3/16	.25	2.06
¾x ¾x⅛	.60	.62	2 x1½x⅛	.25	1.51
⅞x ⅞x⅛	.40	.73	3/16	.15	2.23
1 x ⅝x⅛	.60	.67	2 x2 x⅛	.25	1.73
1 x1 x⅛	.30	.84	3/16	.15	2.56
3/16	.25	1.22	¼	.15	3.35
1¼x1¼x⅛	.30	1.06	2½x2 x3/16	.15	2.88
3/16	.25	1.55	2½x2½x⅛	.25	2.18
¼	.25	2.02	3/16	.15	3.22
1⅜x ⅞x⅛	.40	.96	¼	.15	4.26
1½x1½x⅛	.25	1.29	3 x2 x¼	Base	4.31
3/16	.15	1.89	3 x3 x3/16	.35	3.90
¼	.15	2.46	¼	Base	5.20
1¾x1¾x⅛	.25	1.51	....	....	....

Zees

A. S. T. M.—A-7-34 Minimum Tensile 60000 Lbs. per Square Inch

Flange Inches	Net Extra for Size	Web Inches	Flange Inches	Thickness Inches	Weight Pounds per Ft.
1¼	$1.35	1¾	1¾	3/16	2.8
1¼	.45	1¾	2⅛	7/32	3.49
2 11/16	Base	3	2 11/16	¼	6.7
2¾	Base	3 1/16	2¾	5/16	8.5
2 11/16	Base	3	2 11/16	⅜	9.8
2 11/16	Base	3	2 11/16	½	12.6
3 1/16	Base	4	3 1/16	¼	8.2
3⅛	Base	4 1/16	3⅛	5/16	10.3
3 3/16	Base	4⅛	3 3/16	⅜	12.5
3¼	Base	5	3¼	5/16	11.6
3 5/16	Base	5 1/16	3 5/16	⅜	14.0
3¼	Base	5	3¼	½	17.9
3½	Base	6	3½	⅜	15.7
3⅝	Base	6⅛	3⅝	½	21.1



Channels—Bar Sizes

O. H. Steel .15 to .20 Carbon

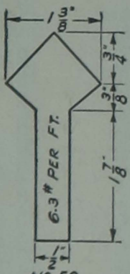
Size Inches	Net Extra for Size	Weight Pounds per Ft.	Size Inches	Net Extra for Size	Weight Pounds Per Ft.
½x¼ x3/32	$3.00	.25	1½x ½ x⅛	$.40	1.12
½x¼ x⅛	2.50	.28	1½x ½ x3/16	.25	1.36
⅝x5/16 x⅛	1.70	.41	1½x 9/16x3/16	.25	1.44
¾x5/16 x.065	1.00	.30	1½x 9/16x¼	.25	1.68
¾x5/16 x⅛	.60	.50	1½x ¾ x⅛	.40	1.17
¾x11/32x3/32	1.00	.40	1½x1½ x3/16	.40	2.63
¾x⅜ xNo. 15	1.00	.40	1¾x ½ x3/16	.25	1.55
¾x⅜ x⅛	.60	.52	1¾x ⅝ x⅛	.40	1.33
⅞x⅜ x⅛	.60	.584	2 x ½ x⅛	.40	1.26
⅞x7/16 x⅛	.60	.63	2 x 9/16x3/16	.25	1.76
1 x⅜ x.079	1.00	.41	2 x ⅝ x3/16	.25	1.98
1 x⅜ x⅛	.50	.68	2 x ⅝ x¼	.25	2.18
1 x½ x⅛	.50	.785	2 x1 x⅛	.40	1.78
1⅛x9/16 x3/16	.40	1.12	2 x1 x3/16	.25	2.32
1¼x½ x⅛	.50	.93	2 x1 x3/16	.25	2.60
1¼x½ x3/16	.40	1.18	2½x ⅝ x3/16	.25	2.27

Channels—Structural

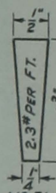
A. S. T. M.—A-7-34 Minimum Tensile 60,000 Lbs. per Square Inch

Depth In.	Wt. Lbs. per Ft.	Thickness Web In.	Width Flange In.	Net Extra for Size
3	4.1	.170	1.410	Base
	5	.258	1.498	Base
	6	.356	1.596	Base
4	5.4	.180	1.580	Base
	6.25	.247	1.647	Base
	7.25	.320	1.720	Base
5	6.7	.190	1.750	Base
	9	.325	1.885	Base
	11.5	.472	2.032	Base
6	8.2	.200	1.920	Base
	10.5	.314	2.034	Base
	13	.437	2.157	Base
	15.5	.559	2.279	Base
7	9.8	.210	2.090	Base
	12.25	.314	2.194	Base
	14.75	.419	2.299	Base
	17.25	.524	2.404	Base
	19.75	.629	2.509	Base
8	11.5	.220	2.260	Base
	13.75	.303	2.343	Base
	16.25	.395	2.435	Base
	18.75	.487	2.527	Base
	21.25	.579	2.619	Base
9	13.4	.230	2.430	Base
9	15	.285	2.485	Base
	20	.448	2.648	Base
	25	.612	2.812	Base
10	8.4	.170	1.500	Special
	15.3	.240	2.600	Base
	20	.379	2.739	Base
	25	.526	2.886	Base
	30	.673	3.033	Base
	35	.820	3.180	Base
12	10.6	.187	1.500	Special
	20.7	.280	2.940	Base
	25	.387	3.047	Base
	30	.510	3.170	Base
	35	.632	3.292	Base
	40	.755	3.415	Base
13	31.8	.375	4.000	Base
	50	.787	4.412	Base
15	33.9	.400	3.400	Base
	35	.422	3.422	Base
	40	.520	3.520	Base
	45	.618	3.618	Base
	50	.716	3.716	Base
	55	.814	3.814	Base
18	45.8	.500	4.000	**$.10**

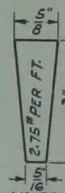
Grizzly Bar Steel



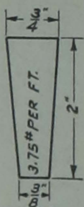
Nº 50



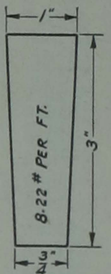
Nº 51



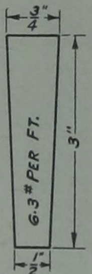
Nº 52



Nº 53



Nº 56



Nº 57

We can furnish Grizzly Bars in any of the shapes illustrated.

For made up grizzlies see page 398.

Prices upon application.

FABRICATED STEEL

•

If you are in the need of fabricated steel, send us your plans and specifications and we will be glad to fabricate according to your plans; or we will furnish estimates of the cost.

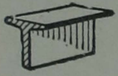
Structural I Beams

A. S. T. M.—A-7-34. Minimum Tensile 60,000 Pounds per Square Inch

Size In.	Wt. Lbs. per Ft.	Thickness Web In.	Width Flange In.	Net Extra for Size
3	5.7	.170	2.330	Base
	6.5	.251	2.411	Base
	7.5	.349	2.509	Base
4	7.7	.190	2.660	Base
	8.5	.253	2.723	Base
	9.5	.326	2.796	Base
	10.5	.400	2.870	Base
5	10	.210	3.000	Base
	12.25	.347	3.137	Base
	14.75	.494	3.284	Base
6	12.5	.230	3.330	Base
	14.75	.343	3.443	Base
	17.25	.465	3.565	Base
7	15.3	.250	3.660	Base
	17.5	.345	3.755	Base
	20	.450	3.860	Base
8	18.4	.270	4.000	Base
	20.5	.349	4.079	Base
	23	.441	4.171	Base
	25.5	.532	4.262	Base
9	21.8	.290	4.330	Base
10	22	.250	5.000	**$.05**
	25.4	.310	4.660	Base
	30	.447	4.797	Base
	35	.594	4.944	Base
	40	.741	5.091	Base
12	25	.270	5.000	**$.05**
12	31.8	.350	5.000	Base
	35	.428	5.078	Base
	40.8	.460	5.250	Base
	45	.565	5.355	Base
	50	.687	5.477	Base
	55	.810	5.600	Base
15	35	.330	5.500	**$.05**
	42.9	.410	5.500	Base
	50	.550	5.640	Base
	55	.648	5.738	Base
	60.8	.590	6.000	Base
	70	.770	6.180	Base
	75	.868	6.278	Base
	100	1.167	6.767	Base
18	54.7	.460	6.000	**$.10**
	60	.547	6.087	**.10**
	65	.629	6.169	**.10**
	70	.711	6.251	**.10**
	75.6	.560	7.000	**.10**
	90	.796	7.236	**.10**
20	65.4	.500	6.250	**.10**
	81.4	.600	7.000	**.10**
	100	.873	7.273	**.10**
24	79.9	.500	7.000	**.10**
	100	.747	7.247	**.10**
	105.9	.625	7.875	**.10**
	115	.737	7.987	**.10**

Tees—Bar Sizes

O. H. Steel .15 to .20 Carbon



In ordering tees, specify by flange first, then by stem and thickness.

Flange In.	Size Stem In.	Thickness Web In.	Wt. Lbs. per Ft.	Net Extra for Size
¾	**¾**	**⅛**	.60	**$1.10**
⅞	**⅞**	**⅛**	.73	**.90**
1	**1**	**⅛**	.90	**.70**
1	**1**	**3/16**	1.20	**.55**
1⅛	**1⅛**	**3/16**	1.37	**.55**
1¼	**1¼**	**⅛**	1.09	**.70**
1¼	**1¼**	**3/16**	1.55	**.55**
1¼	**1¼**	**¼**	1.98	**.55**
1½	**1½**	**3/16**	1.88	**.30**
1½	**1½**	**¼**	2.43	**.30**
1¾	**1¾**	**3/16**	2.30	**$.30**
1¾	**1¾**	**¼**	2.90	**.30**
2	**1½**	**¼**	3.10	**.30**
2	**2**	**¼**	3.38	**.30**
2	**2**	**5/16**	4.4	**.30**
2¼	**2¼**	**¼**	4.1	**.30**
2¼	**2¼**	**5/16**	4.9	**.30**
2½	**2½**	**¼**	4.6	**.30**
2½	**2½**	**5/16**	5.5	**.30**
2½	**2½**	**⅜**	6.4	**.30**

Tees—Structural

A. S. T. M.—A-7-34. Minimum Tensile 60,000 Pounds per Square Inch

Flange In.	Size Stem In.	Thickness Web In.	Wt. Lbs. per Ft.	Net Extra for Size
2½	**3**	**5/16**	6.1	**$.10**
3	**2½**	**5/16**	6.1	**.10**
3	**3**	**¼**	5.5	**.10**
3	**3**	**5/16**	6.7	**.10**
3	**3**	**⅜**	7.8	**.10**
3	**3½**	**⅜**	8.5	**.10**
3½	**3**	**⅜**	8.5	**.10**
3½	**3½**	**⅜**	9.2	**.10**
3½	**3½**	**½**	11.7	**.10**
3½	**4**	**⅜**	9.8	**.10**
4	**2½**	**⅜**	8.5	**$.10**
4	**3**	**⅜**	9.2	**.10**
4	**4**	**⅜**	10.5	**.10**
4	**4**	**½**	13.5	**.10**
4	**5**	**⅜**	11.9	**.10**
4	**5**	**½**	15.3	**.10**
4½	**2½**	**⅜**	9.2	**.10**
4½	**3½**	††	15.7	**.10**
5	**3**	**½**	13.6	**.10**
6½	**6½**	..	19.8	**.20**

††Flange thickness is 7/16 inch; stem thickness, 11/16 inch.

All sizes cut to 5 feet and longer without charge. Under 5 feet subject to extras.

Steel Plates

Universal Mill

Class A, Manufacturers' Standard Specifications and A.S.T.M. for Bridges

Size Inches	Net Extra for Size	Estimated Weight Pounds per Foot
No. 10x7 and 8 See Bands		
3/16x7 to 22 See Bands		
3/16x24 to 48 See Sheets		
¼x 7	Base	5.95
8	Base	6.80
9	Base	7.65
10	Base	8.50
12	Base	10.20
14	Base	11.90
16	Base	13.60
18	Base	15.30
20	Base	17.00
22	Base	18.70
24	Base	20.40
5/16x 7	Base	7.44
8	Base	8.50
9	Base	9.56
10	Base	10.62
12	Base	12.75
14	Base	14.88
16	Base	17.00
18	Base	19.12
20	Base	21.25
22	Base	23.37
24	Base	25.52
⅜x 7	Base	8.93
8	Base	10.20
9	Base	11.48
10	Base	12.75
12	Base	15.30
14	Base	17.85
16	Base	20.40
18	Base	22.95
20	Base	25.50
22	Base	28.05
24	Base	30.60
7/16x 7	Base	10.41
8	Base	11.90
10	Base	14.88
½x 7	Base	11.90
8	Base	13.60
9	Base	15.30
10	Base	17.00
12	Base	20.40
14	Base	23.80
16	Base	27.20
18	Base	30.60
20	Base	34.00
22	Base	37.40
24	Base	40.80

Size Inches	Net Extra for Size	Estimated Weight Pounds per Foot
⅝x 7	Base	14.88
8	Base	17.00
9	Base	19.13
10	Base	21.25
12	Base	25.50
14	Base	29.75
16	Base	34.00
18	Base	38.25
20	Base	42.50
22	Base	46.75
24	Base	51.00
¾x 7	Base	17.85
8	Base	20.40
9	Base	22.95
10	Base	25.50
12	Base	30.60
14	Base	35.70
16	Base	40.80
18	Base	45.90
20	Base	51.00
24	Base	61.20
⅞x 8	Base	23.80
10	Base	29.75
12	Base	35.70
14	Base	41.65
24	Base	71.40
1 x 7	Base	23.80
8	Base	27.20
9	Base	30.60
10	Base	34.00
12	Base	40.80
14	Base	47.60
16	Base	54.40
18	Base	61.20
20	Base	68.00
24	Base	81.60
1¼x 7	Base	29.75
8	Base	34.00
10	Base	42.50
12	Base	51.00
1½x 7	Base	35.70
8	Base	40.80
10	Base	51.00
12	Base	61.20
1¾x 8	Base	47.60
2 x 7	Base	47.60
8	Base	54.40
9	Base	61.20
10	Base	68.00
12	Base	81.60
2½x 9	Base	68.85

Sheared—Long Lengths

Class A, Manufacturers' Standard Specifications and A.S.T.M. for Bridges

Size Inches	Net Extra for Size	Estimated Weight Pounds per Foot
3/16x24 to 48 See Sheets		
3/16x54	$.20	34.43
60	.20	38.25
72	.20	45.90
84	.70	53.55
96	.80	61.28
¼x30	Base	25.50
36	Base	30.60
42	Base	35.70
48	Base	40.80
54	Base	45.90
60	Base	51.00
72	Base	61.20
84	Base	71.40
96	Base	81.60
120	$.15	102.00
5/16x30	Base	31.88
36	Base	38.25
42	Base	44.65
48	Base	51.00
54	Base	57.38
60	Base	63.75
72	Base	76.50
84	Base	89.25
96	Base	102.00
120	$.15	127.50
⅜x30	Base	38.25
36	Base	45.90
42	Base	53.55
48	Base	61.20
54	Base	68.85
60	Base	76.50
72	Base	91.80
84	Base	107.10
96	Base	122.40
120	$.15	153.12
7/16x30	Base	44.63
36	Base	53.55
42	Base	62.48
48	Base	71.40
54	Base	80.33
60	Base	89.25
72	Base	107.10
84	Base	124.95
96	Base	142.80
½x30	Base	51.00
36	Base	61.20
42	Base	71.40
48	Base	81.60
54	Base	91.80
60	Base	102.00
72	Base	122.40
84	Base	142.80
96	Base	163.20
120	$.15	204.00

Size Inches	Net Extra for Size	Estimated Weight Pounds per Foot
9/16x30	Base	57.38
36	Base	68.85
42	Base	80.33
48	Base	91.80
54	Base	103.28
60	Base	114.75
72	Base	137.70
⅝x30	Base	63.75
36	Base	76.50
48	Base	102.00
60	Base	127.50
72	Base	153.00
84	Base	178.56
96	Base	204.00
¾x30	Base	76.50
36	Base	91.80
42	Base	107.10
48	Base	122.40
60	Base	153.00
72	Base	183.60
96	Base	244.80
⅞x48	Base	142.80
60	Base	178.50
72	Base	214.20
84	Base	249.90
96	Base	285.60
1 x30	Base	102.00
36	Base	122.40
48	Base	163.20
60	Base	204.00
72	Base	244.80
96	Base	326.40
1⅛x72	Base	275.40
1¼x72	Base	306.00
1⅜x72	Base	336.60
1½x72	Base	367.20
1⅝x72	Base	397.80
1¾x72	Base	428.40
2 x72	Base	489.60
2¼x56	Base	428.40
2½x56	Base	476.00
2¾x56	Base	523.60
3 x56	Base	571.20
3¼x56	Base	618.80
3½x56	Base	666.40
3¾x56	Base	714.00
4 x56	Base	761.60
4½x56	Base	856.80
5 x56	Base	952.00
5½x56	Base	1047.20
6 x56	Base	1142.40
7 x56	Base	1332.80
8 x48	Base	1305.60
10 x48	Base	1632.00

Flange

These plates meet the requirements of the A.S.M.E. Code and Hartford Steam Boiler Inspection and Insurance Company.

Size Inches	Net Extra for Size and Quality	Estimated Weight Pounds per Foot
¼x48	$.25	40.8
60	.25	51.
72	.25	61.2
84	.25	71.4
96	.25	81.6
120	.40	102.
5/16x48	.25	51.
60	.25	63.8
72	.25	76.5
84	.25	89.25
96	.25	102.
120	.40	127.5
⅜x48	.25	61.2
60	.25	76.5
72	.25	91.8
84	.25	107.1
96	.25	122.4
7/16x72	.25	107.1
84	.25	124.9
96	.25	142.8
120	.40	178.5
½x48	.25	81.6
60	.25	102.
72	.25	122.4
84	.25	142.8
96	.25	163.2
120	.40	204.
⅝x60	.25	127.5
72	.25	153.
84	.25	178.5
96	.25	204.
¾x60	.25	153.
72	.25	183.6
84	.25	214.2
96	.25	244.8
⅞x72	.25	214.2
1 x60	.25	204.
72	.25	244.8
96	.25	326.4
1⅛x72	.25	275.4
1¼x72	.25	306.
1½x72	.25	317.
1¾x72	.25	428.4

Cutting Extras

Plate Shearing to Length 3/16 to 1 Inch

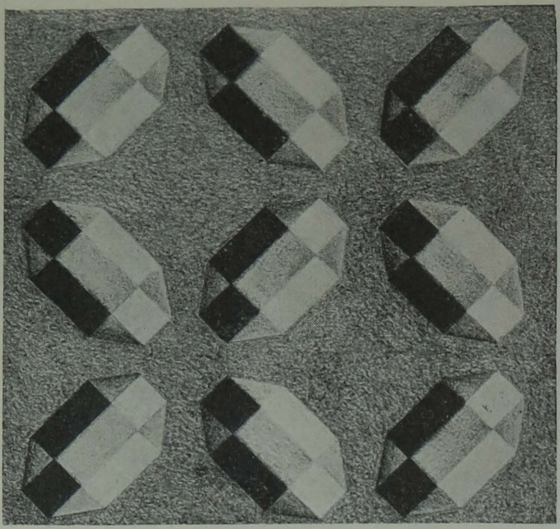
Length Feet	Per 100 Lbs.
5 and Longer	Base
Under 5 to 3	....
Under 3 to 2	....
Under 2 to 1	....
Under 1 to Over ½	....

Over 1 inch, extras upon application.

Shearing to width, upon application.

Above plates cut to any size. Standard cutting charges apply.

Multigrip Floor Plate



This design provides maximum skid resistance regardless of the way the plate is laid or the angle from which it is approached. Assures the greatest possible safety for all installations where the plate is crossed at various angles.

The risers on multigrip floor plate have no long surfaces for shoes to slide on. The spacing causes the foot to be in contact with several risers at right angles to one another at all times. Whether the plate is wet or dry, there is constant resistance to sliding or skidding.

The plate is designed so drainage is complete and immediate in any direction.

Drainage channels are unobstructed. There are no pockets from which water cannot flow.

There are no gutters in which a thin-tired wheel may catch. Wheels roll on the risers, not between them, smoothly and efficiently.

The use of multigrip on bridge traffic lanes increases the safety of the entire structure and reduces maintenance, in addition to protecting traffic.

The pattern in multigrip floor plate is continuous, whether adjoining plates are laid end to end, side to side or end to side. Consequently, neat installations can be made at a minimum cost. This symmetrical design minimizes waste in cutting.

Multigrip floor plate risers are scientifically distributed. They are flat on top. They feel comfortable under foot. The sloping sides of these risers make it impossible to catch the toe of a shoe on them. They are comfortable to work on and comfortable to walk on.

The modified lozenge shape of the risers on multigrip floor plate leaves no pockets in which dirt can accumulate. All side faces are sloping so that a broom easily brushes all dirt past and away from the risers. Rolling of the plate is carefully controlled, assuring a smooth even surface, easy to keep clean.

Widths 6 to 15 inches are 120 inches long; 15 to 30 inches wide are 240 inches long; 30 to 84 inches wide are 480 inches long.

Widths over 60 inches are not furnished in ¾ and ⅝-inch thicknesses.

Thickness Inches	Weight per Square Foot Pounds	Thickness Inches	Weight per Square Foot Pounds
¾	31.65	⅜	16.35
⅝	26.55	5/16	13.80
½	21.45	¼	11.25
7/16	18.90	3/16	8.70

Heavy Hot Rolled Steel Sheets

Size Inches	Net Extra for Size	Estimated Wt. Lbs. per Sheet	Size Inches	Net Extra for Size	Estimated Wt. Lbs. per Sheet
No. 10					
24x 96	Base	90.0	48x156	Base	292.5
24x120	Base	112.5	54x 96	$.15	202.5
26x 96	Base	97.5	54x120	.15	253.1
26x120	Base	121.9	54x156	.15	329.1
28x 96	Base	105.0	60x 96	.15	225.0
28x120	Base	131.3	60x120	.15	281.3
30x 96	Base	112.5	60x144	.15	337.5
30x120	Base	140.6	60x168	.15	393.8
36x 96	Base	135.0	72x 96	.25	270.0
36x108	Base	151.9	72x120	.25	337.5
36x120	Base	168.8	72x144	.25	405.0
36x144	Base	202.5	72x168	.25	472.5
36x156	Base	219.4	72x192	.25	540.0
40x 96	Base	150.0	72x240	.25	675.0
40x120	Base	187.5	84x 96	.50	315.0
42x 96	Base	157.5	84x120	.50	393.8
42x120	Base	196.9	84x144	.50	472.5
42x144	Base	236.3	84x168	.50	550.3
48x 96	Base	180.0	84x192	.50	630.0
48x120	Base	225.0	84x240	.50	787.5
48x144	Base	270.0	......	....	.....
No. 11					
24x120	$.05	100.0	48x 96	$.05	160.0
24x144	.05	120.0	48x120	.05	200.0
30x120	.05	125.0	48x144	.05	240.0
30x144	.05	150.0	54x144	.20	270.0
36x 96	.05	120.0	60x 96	.20	200.0
36x120	.05	150.0	60x120	.20	250.0
36x144	.05	180.0	60x144	.20	300.0
42x 96	.05	140.0	72x120	.30	300.0
42x120	.05	175.0	72x144	.30	360.0
42x144	.05	210.0	72x156	.30	390.0
No. 12					
24x 96	$.10	70.0	54x 96	$.25	157.5
24x120	.10	87.5	54x120	.25	196.9
28x 96	.10	81.7	54x156	.25	255.9
28x120	.10	102.1	60x 96	.25	175.0
30x 96	.10	87.5	60x120	.25	218.8
30x120	.10	109.4	60x144	.25	262.5
36x 96	.10	105.0	60x168	.25	306.3
36x108	.10	118.1	72x 96	.35	210.0
36x120	.10	131.3	72x120	.35	262.5
36x144	.10	157.5	72x144	.35	315.0
40x 96	.10	116.7	72x168	.35	367.6
40x120	.10	145.8	72x192	.35	420.0
42x 96	.10	122.5	72x240	.35	525.2
42x120	.10	153.1	84x 96	.60	245.0
42x144	.10	183.8	84x120	.60	306.2
48x 96	.10	140.0	84x144	.60	367.5
48x120	.10	175.0	84x168	.60	428.8
48x144	.10	210.0	84x192	.60	490.0
48x156	.10	227.5	84x240	.60	612.4
No. 14					
24x 96	$.20	50.0	42x120	$.20	109.4
24x120	.20	62.5	42x144	.20	131.3
26x 96	.20	54.2	48x 96	.20	100.0
26x120	.20	67.7	48x120	.20	125.0
28x 96	.20	58.3	48x144	.20	150.0
28x120	.20	72.9	48x156	.20	162.5
30x 96	.20	62.5	54x 96	.35	112.5
30x120	.20	78.1	54x120	.35	140.6
36x 96	.20	75.0	54x156	.35	182.8
36x108	.20	84.4	60x 96	.35	125.0
36x120	.20	93.8	60x120	.35	156.3
36x144	.20	112.5	60x144	.35	187.5
40x 96	.20	83.3	60x168	.35	218.8
40x120	.20	104.2	72x120	.70	187.5
42x 96	.20	87.5	72x144	.70	225.0
No. 16					
24x 96	$.35	40.0	42x120	$.35	87.5
24x120	.35	50.0	42x144	.35	105.0
26x 96	.35	43.3	48x 96	.35	80.0
26x120	.35	54.2	48x120	.35	100.0
28x 96	.35	46.7	48x144	.35	120.0
28x120	.35	58.3	48x156	.35	130.0
30x 96	.35	50.0	54x 96	.50	90.0
30x120	.35	62.5	54x120	.50	112.5
36x 96	.35	60.0	54x156	.50	146.3
36x108	.35	67.5	60x 96	.50	100.0
36x120	.35	75.0	60x120	.50	125.0
36x144	.35	90.0	60x144	.50	150.0
40x 96	.35	66.7	60x168	.50	175.0
40x120	.35	83.3	72x120	.85	150.0
42x 96	.35	70.0	72x144	.85	180.0

Hot Rolled Annealed Steel Sheets

No. 18

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
24x 96	—$.15	32.0	30x120	—$.15	50.0
24x120	— .15	40.0	36x 96	— .15	48.0
26x 96	— .15	34.7	36x108	— .15	54.0
26x120	— .15	43.3	36x120	— .15	60.0
28x 96	— .15	37.3	42x 96	— .15	56.0
28x120	— .15	46.7	42x120	— .15	70.0
30x 96	— .15	40.0	48x 96	— .15	64.0
30x108	— .15	45.0	48x120	— .15	80.0

No. 20

24x 96	—$.10	24.0	30x 96	—$.10	30.0
24x120	— .10	30.0	30x120	— .10	37.5
26x 96	— .10	26.0	36x 96	— .10	36.0
26x120	— .10	32.5	36x120	— .10	45.0
28x 72	— .10	21.0	42x 96	— .10	42.0
28x 84	— .10	24.5	42x120	— .10	52.5
28x 96	— .10	28.0	48x 96	— .10	48.0
28x108	— .10	31.5	48x120	— .10	60.0
28x120	— .10	35.0	......	......	....

No. 22

24x 96	—$.05	20.0	30x 96	—$.05	25.0
24x120	— .05	25.0	30x120	— .05	31.3
26x 96	— .05	21.7	36x 96	— .05	30.0
26x120	— .05	27.1	36x120	— .05	37.5
28x 72	— .05	17.5	42x 96	+ .15	35.0
28x 84	— .05	20.4	42x120	+ .15	43.8
28x 96	— .05	23.3	48x 96	+ .35	40.0
28x108	— .05	26.3	48x120	+ .35	50.0
28x120	— .05	29.2	......	......	....

No. 24

24x 96	Base	16.0	28x120	Base	23.3
24x120	Base	20.0	30x 96	Base	20.0
26x 96	Base	17.3	30x120	Base	25.0
26x120	Base	21.7	36x 96	Base	24.0
28x 72	Base	14.0	36x120	Base	30.0
28x 84	Base	16.3	42x 96	$.20	28.0
28x 96	Base	18.7	42x120	.20	35.0
28x108	Base	21.0	48x120	.40	40.0

No. 26

24x 96	$.10	12.0	28x120	$.10	17.5
24x120	.10	15.0	30x 96	.10	15.0
26x 96	.10	13.0	30x120	.10	18.8
26x120	.10	16.3	36x 96	.10	18.0
28x 72	.10	10.5	36x120	.10	22.5
28x 84	.10	12.3	42x 96	.40	21.0
28x 96	.10	14.0	42x120	.40	26.3
28x108	.10	15.8	......	...	....

No. 28

24x 96	$.25	10.0	28x120	$.25	14.6
24x120	.25	12.5	28x144	.35	17.5
28x 72	.25	8.8	30x 96	.25	12.5
28x 84	.25	10.2	30x120	.25	15.6
28x 96	.25	11.7	36x 96	.40	15.0
28x108	.25	13.1	36x120	.40	18.8

No. 30

24x 96	$.50	8.0	30x 96	$.50	10.0

Sheets 22 gauge and lighter are banded in bundles of approximately 150 pounds each.

Black Sheets

Table of Weights without Bands and Number of Sheets per Bundle, Square Feet and Weight of Sheets

		Gauge No.								
		10			11			12		
		Wt., Lbs., per Sq. Ft.								
		5.625			5			4.375		
Size Inches	Sq. Ft. per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	67.50	2	135	60.00	3	180	52.50	3	157
26x 72	13.00	73.13	2	146	65.00	2	130	56.88	3	171
28x 72	14.00	78.75	2	157	70.00	2	140	61.25	2	122
30x 72	15.00	84.38	2	169	75.00	2	150	65.63	2	131
36x 72	18.00	101.25	1	101	90.00	2	180	78.75	2	157
24x 84	14.00	78.75	2	157	70.00	2	140	61.25	2	122
26x 84	15.16	85.31	2	171	75.83	2	152	66.35	2	133
28x 84	16.33	91.88	2	184	81.67	2	163	71.46	2	143
30x 84	17.50	98.44	1	98	87.50	2	175	76.56	2	153
36x 84	21.00	118.13	1	118	105.00	1	105	91.88	2	184
24x 96	16.00	90.00	2	180	80.00	2	160	70.00	2	140
26x 96	17.33	97.50	2	195	86.67	2	173	75.83	2	152
28x 96	18.66	105.00	1	105	93.33	2	187	81.67	2	163
30x 96	20.00	112.50	1	113	100.00	1	100	87.50	2	175
36x 96	24.00	135.00	1	135	120.00	1	120	105.00	1	105
24x108	18.00	101.25	1	101	90.00	2	180	78.75	2	157
26x108	19.50	109.69	1	110	97.50	2	195	85.31	2	171
28x108	21.00	118.13	1	118	105.00	1	105	91.88	2	184
30x108	22.50	126.56	1	127	112.50	1	112	98.44	1	98
36x108	27.00	151.88	1	152	135.00	1	135	118.13	1	118
24x120	20.00	112.50	1	112	100.00	1	100	87.50	2	175
26x120	21.66	121.88	1	122	108.33	1	108	94.79	2	198
28x120	23.33	131.25	1	131	116.67	1	117	102.08	1	102
30x120	25.00	140.63	1	141	125.00	1	125	109.38	1	109
36x120	30.00	168.75	1	169	150.00	1	150	131.25	1	131

		Gauge No.								
		13			14			15		
		Wt., Lbs., per Sq. Ft.								
		3.75			3.125			2.8125		
Size Inches	Sq. Ft. per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	45.00	3	135	37.50	4	150	33.75	4	135
26x 72	13.00	48.75	3	146	40.63	4	162	36.56	4	146
28x 72	14.00	52.50	3	157	43.75	3	131	39.37	4	157
30x 72	15.00	56.25	3	169	46.88	3	141	42.19	4	169
36x 72	18.00	67.50	2	135	56.25	3	169	50.63	3	152
24x 84	14.00	52.50	3	157	43.75	3	131	39.38	4	157
26x 84	15.16	56.88	3	171	47.40	3	142	42.66	3	128
28x 84	16.33	61.25	2	122	51.04	3	153	45.94	3	138
30x 84	17.50	65.63	2	131	54.69	3	164	49.22	3	148
36x 84	21.00	78.75	2	157	65.63	2	131	59.06	2	118
24x 96	16.00	60.00	2	120	50.00	3	150	45.00	3	135
26x 96	17.33	65.00	2	130	54.17	3	162	48.75	3	146
28x 96	18.66	70.00	2	140	58.33	3	175	52.50	3	157
30x 96	20.00	75.00	2	150	62.50	2	125	56.25	3	169
36x 96	24.00	90.00	2	180	75.00	2	150	67.50	2	135
24x108	18.00	67.50	2	135	56.25	3	169	50.63	3	152
26x108	19.50	73.13	2	146	60.94	2	122	54.84	3	164
28x108	21.00	78.75	2	157	65.63	2	131	59.06	3	177
30x108	22.50	84.38	2	169	70.31	2	141	63.28	2	126
36x108	27.00	101.25	1	101	84.38	2	169	75.94	2	152
24x120	20.00	75.00	2	150	62.50	2	125	56.25	3	169
26x120	21.66	81.25	2	162	67.71	2	135	60.94	2	122
28x120	23.33	87.50	2	175	72.92	2	146	65.63	2	131
30x120	25.00	93.75	2	187	78.13	2	156	70.31	2	141
36x120	30.00	112.50	1	113	93.75	2	187	84.38	2	169

		Gauge No.								
		16			17			18		
		Wt., Lbs., per Sq. Ft.								
		2.5			2.25			2		
Size Inches	Sq. Ft. per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x72	12.00	30.00	5	150	27.00	6	162	24.00	6	144
26x72	13.00	32.50	5	162	29.25	5	146	26.00	6	156
28x72	14.00	35.00	4	140	31.50	5	157	28.00	5	140
30x72	15.00	37.50	4	150	33.75	4	135	30.00	5	150
36x72	18.00	45.00	3	135	40.50	4	162	36.00	4	144
24x84	14.00	35.00	4	140	31.50	5	157	28.00	5	140
26x84	15.16	37.92	4	152	34.13	4	136	30.33	5	152
28x84	16.33	40.83	4	163	36.75	4	147	32.67	5	163
30x84	17.50	43.75	3	131	39.38	4	157	35.00	4	140
36x84	21.00	52.50	3	157	47.25	3	142	42.00	4	168

Black Sheets

Table of Weights without Bands and Number of Sheets per Bundle, Square Feet and Weight of Sheets

Continued

		Gauge No.								
		16			17			18		
		Wt., Lbs., per Sq. Ft.								
		2.5			2.25			2		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 96	16.00	40.00	4	160	36.00	4	144	32.00	5	160
26x 96	17.33	43.33	3	130	39.00	4	156	34.67	4	139
28x 96	18.66	46.67	3	140	42.00	4	168	37.33	4	149
30x 96	20.00	50.00	3	150	45.00	3	135	40.00	4	160
36x 96	24.00	60.00	2	120	54.00	3	162	48.00	3	144
24x108	18.00	45.00	3	135	40.50	4	162	36.00	4	144
26x108	19.50	48.75	3	146	43.88	3	132	39.00	4	156
28x108	21.00	52.50	3	157	47.25	3	142	42.00	4	168
30x108	22.50	56.25	3	169	50.63	3	152	45.00	3	135
36x108	27.00	67.50	2	135	60.75	2	121	54.00	3	162
24x120	20.00	50.00	3	150	45.00	3	135	40.00	4	160
26x120	21.66	54.17	3	162	48.75	3	146	43.33	3	130
28x120	23.33	58.33	3	175	52.50	3	157	46.67	3	140
30x120	25.00	62.50	2	125	56.25	3	169	50.00	3	150
36x120	30.00	75.00	2	150	67.50	2	135	60.00	2	120

		Gauge No.								
		19			20			21		
		Wt., Lbs., per Sq. Ft.								
		1.75			1.5			1.375		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	21.00	7	147	18.00	8	144	16.50	9	148
26x 72	13.00	22.75	7	159	19.50	8	156	17.88	8	143
28x 72	14.00	24.50	6	147	21.00	7	147	19.25	8	154
30x 72	15.00	26.25	6	157	22.50	7	157	20.63	7	144
36x 72	18.00	35.00	5	157	27.00	5	135	24.75	6	148
24x 84	14.00	24.50	6	147	21.00	7	147	19.25	8	154
26x 84	15.16	26.54	6	159	22.75	7	159	20.85	7	146
28x 84	16.33	28.58	5	143	24.50	6	147	22.46	7	157
30x 84	17.50	30.63	5	153	26.25	6	157	24.06	6	144
36x 84	21.00	36.75	4	147	31.50	5	157	28.88	5	144
24x 96	16.00	28.00	5	140	24.00	6	144	22.00	7	154
26x 96	17.33	30.33	5	152	26.00	6	156	23.83	6	143
28x 96	18.66	32.67	5	163	28.00	5	140	25.67	6	154
30x 96	20.00	35.00	4	140	30.00	5	150	27.50	6	165
36x 96	24.00	42.00	4	168	36.00	4	144	33.00	5	165
24x108	18.00	31.50	5	157	27.00	5	135	24.75	6	148
26x108	19.50	34.13	4	136	29.25	5	146	26.81	6	161
28x108	21.00	36.75	4	147	31.50	5	157	28.87	5	144
30x108	22.50	39.38	4	157	33.75	4	135	30.94	5	155
36x108	27.00	47.25	3	142	40.50	4	162	37.13	4	148
24x120	20.00	35.00	4	140	30.00	5	150	27.50	5	137
26x120	21.66	37.92	4	152	32.50	5	162	29.79	5	149
28x120	23.33	40.83	4	163	35.00	4	140	32.08	5	160
30x120	25.00	43.75	3	131	37.50	4	150	34.37	4	137
36x120	30.00	52.50	3	157	45.00	3	135	41.20	4	165

		Gauge No.								
		22			23			24		
		Wt., Lbs., per Sq. Ft.								
		1.25			1.125			1		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	15.00	10	150	13.50	11	148	12.00	12	144
26x 72	13.00	16.25	9	146	14.63	10	146	13.00	11	143
28x 72	14.00	17.50	8	140	15.75	9	142	14.00	11	154
30x 72	15.00	18.75	8	150	16.88	9	152	15.00	10	150
36x 72	18.00	22.50	7	157	20.25	7	142	18.00	8	144
24x 84	14.00	17.50	8	140	15.75	9	142	14.00	11	154
26x 84	15.16	18.96	8	152	17.06	9	153	15.16	10	152
28x 84	16.33	20.42	7	143	18.37	8	147	16.33	9	147
30x 84	17.50	21.88	7	153	19.69	8	157	17.50	8	140
36x 84	21.00	26.25	6	157	23.63	6	142	21.00	7	147
24x 96	16.00	20.00	7	140	18.00	8	144	16.00	9	144
26x 96	17.33	21.67	7	152	19.50	8	156	17.33	9	156
28x 96	18.66	23.33	6	140	21.00	7	147	18.67	8	149
30x 96	20.00	25.00	6	150	22.50	7	157	20.00	7	140
36x 96	24.00	30.00	5	150	27.00	6	162	24.00	6	144
24x108	18.00	22.50	7	157	20.25	7	142	18.00	8	144
26x108	19.50	24.37	6	146	21.94	7	153	19.50	8	156

Black Sheets

Table of Weights without Bands and Number of Sheets per Bundle, Square Feet and Weight of Sheets

Continued

		Gauge No.								
		22			23			24		
		Wt., Lbs., per Sq. Ft.								
		1.125			1.125			1		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
28x108	21.00	26.25	6	157	23.62	6	142	21.00	7	147
30x108	22.50	28.12	5	141	25.31	6	152	22.50	7	157
36x108	27.00	33.75	5	169	30.38	5	152	27.00	6	162
24x120	20.00	25.00	6	150	22.50	7	157	20.00	7	140
26x120	21.66	27.08	6	162	24.37	6	146	21.67	7	152
28x120	23.33	29.17	5	146	26.25	6	157	23.33	6	140
30x120	25.00	31.25	5	156	28.12	5	141	25.00	6	150
36x120	30.00	37.50	4	150	33.75	5	169	30.00	5	150

		Gauge No.								
		25			26			27		
		Wt., Lbs., per Sq. Ft.								
		.875			.75			.6875		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	10.50	14	147	9.00	16	144	8.25	18	148
26x 72	13.00	11.38	13	148	9.75	15	146	8.94	16	143
28x 72	14.00	12.25	12	147	10.50	14	147	9.63	16	154
30x 72	15.00	13.13	11	144	11.25	13	146	10.31	14	144
36x 72	18.00	15.75	9	142	13.50	11	148	12.38	12	148
24x 84	14.00	12.25	12	147	10.50	14	147	9.63	15	144
26x 84	15.16	13.27	11	146	11.38	13	148	10.43	14	146
28x 84	16.33	14.29	10	143	12.25	12	147	11.23	13	146
30x 84	17.50	15.31	10	153	13.13	11	144	12.03	12	144
36x 84	21.00	18.38	8	147	15.75	9	142	14.44	10	144
24x 96	16.00	14.00	10	140	12.00	12	144	11.00	13	143
26x 96	17.33	15.17	10	152	13.00	11	143	11.92	12	143
28x 96	18.66	16.33	9	147	14.00	11	154	12.83	12	154
30x 96	20.00	17.50	8	140	15.00	10	150	13.75	11	151
36x 96	24.00	21.00	7	147	18.00	8	144	16.50	9	148
24x108	18.00	15.75	9	142	13.50	11	148	12.38	12	148
26x108	19.50	17.06	9	153	14.63	10	146	13.41	11	147
28x108	21.00	18.38	8	147	15.75	9	142	14.44	10	144
30x108	22.50	19.69	8	157	16.88	9	152	15.47	10	155
36x108	27.00	23.63	6	142	20.25	7	142	18.56	8	148
24x120	20.00	17.50	8	140	15.00	10	150	13.75	11	151
26x120	21.66	18.96	8	152	16.25	9	146	14.90	10	149
28x120	23.33	20.42	7	143	17.50	8	140	16.04	9	144
30x120	25.00	21.88	7	153	18.75	8	150	17.19	9	155
36x120	30.00	26.25	6	157	22.50	7	157	20.63	8	165

		Gauge No.				
		28			30	
		Wt., Lbs., per Sq. Ft.				
		.625			.5	
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	7.50	20	150	6.00	25	150
26x 72	13.00	8.13	18	146	6.50	23	149
28x 72	14.00	8.75	17	149	7.00	21	147
30x 72	15.00	9.38	16	150	7.50	20	150
36x 72	18.00	11.25	13	146	9.00	16	144
24x 84	14.00	8.75	17	149	7.00	21	147
26x 84	15.16	9.48	16	152	7.58	19	144
28x 84	16.33	10.21	14	143	8.17	19	155
30x 84	17.50	10.94	14	153	8.75	17	149
36x 84	21.00	13.13	11	144	10.50	14	147
24x 96	16.00	10.00	15	150	8.00	18	144
26x 96	17.33	10.83	14	152	8.67	17	147
28x 96	18.66	11.67	13	152	9.33	16	149
30x 96	20.00	12.50	12	150	10.00	15	150
36x 96	24.00	15.00	10	150	12.00	12	144
24x108	18.00	11.25	13	146	9.00	17	153
26x108	19.50	12.19	12	146	9.75	15	146
28x108	21.00	13.13	11	144	10.50	15	157
30x108	22.50	14.06	11	155	11.25	13	146
36x108	27.00	16.88	9	152	13.50	11	148
24x120	20.00	12.50	12	150	10.00	15	150
26x120	21.66	13.54	11	149	10.83	14	152
28z120	23.33	14.58	10	146	11.67	14	163
30x120	25.00	15.63	10	156	12.50	12	150
36x120	30.00	18.75	8	150	15.00	10	150

Galvanized Sheets

Table of Weights without Bands and Number of Sheets per Bundle, Square Feet and Weight of Sheets

Size Inches	Sq. Ft. per Sheet	Gauge No. 10			11			12		
		Wt., Lbs., per Sq. Ft. 5.781			5.156			4.531		
		Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	69.4	2	139	61.9	3	186	54.4	3	163
26x 72	13.00	75.2	2	150	67.0	2	134	58.9	3	177
28x 72	14.00	80.9	2	162	72.2	2	144	63.4	2	127
30x 72	15.00	86.7	2	173	77.3	2	155	68.0	2	136
36x 72	18.00	104.1	*	*	92.8	2	186	81.6	2	163
24x 84	14.00	80.9	2	162	72.2	2	144	63.4	2	127
26x 84	15.17	87.7	2	175	78.2	2	156	68.7	2	137
28x 84	16.33	94.4	2	189	84.2	2	168	74.0	2	148
30x 84	17.50	101.2	*	*	90.2	2	180	79.3	2	159
36x 84	21.00	121.4	*	*	108.3	*	*	95.2	2	190
24x 96	16.00	92.5	2	185	82.5	2	165	72.5	2	145
26x 96	17.33	100.2	*	*	89.4	2	179	78.5	2	157
28x 96	18.67	107.9	*	*	96.3	2	193	84.6	2	169
30x 96	20.00	115.6	*	*	103.1	*	*	90.6	2	181
36x 96	24.00	138.8	*	*	123.8	*	*	108.8	*	*
24x108	18.00	104.1	*	*	92.8	2	186	81.6	2	163
26x108	19.50	112.7	*	*	100.5	*	*	88.4	2	177
28x108	21.00	121.4	*	*	108.3	*	*	95.2	2	190
30x108	22.50	130.1	*	*	116.0	*	*	102.0	*	*
36x108	27.00	156.1	*	*	139.2	*	*	122.3	*	*
24x120	20.00	115.6	*	*	103.1	*	*	90.6	2	181
26x120	21.67	125.3	*	*	111.7	*	*	98.2	*	*
28x120	23.33	134.9	*	*	120.3	*	*	105.7	*	*
30x120	25.00	144.5	*	*	128.9	*	*	113.3	*	*
36x120	30.00	173.4	*	*	154.7	*	*	135.9	*	*

Size Inches	Sq. Ft. per Sheet	Gauge No. 13			14			15		
		Wt., Lbs., per Sq. Ft. 3.906			3.281			2.969		
		Wt., Lbs. per Sheet	Sheets per Bundle	Wt., Lbs. per Bundle	Wt., Lbs. per Sheet	Sheets per Bundle	Wt., Lbs. per Bundle	Wt., Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	46.9	3	141	39.4	4	158	35.6	4	143
26x 72	13.00	50.8	3	152	42.7	4	171	38.6	4	154
28x 72	14.00	54.7	3	164	45.9	3	138	41.6	4	166
30x 72	15.00	58.6	3	176	49.2	3	148	44.5	3	134
36x 72	18.00	70.3	2	141	59.1	3	177	53.4	3	160
24x 84	14.00	54.7	3	164	45.9	3	138	41.6	4	166
26x 84	15.17	59.2	3	178	49.8	3	149	45.0	3	135
28x 84	16.33	63.8	2	128	53.6	3	161	48.5	3	145
30x 84	17.50	68.4	2	137	57.4	3	172	52.0	3	156
36x 84	21.00	82.0	2	164	68.9	2	138	62.3	2	125
24x 96	16.00	62.5	2	125	52.5	3	158	47.5	3	143
26x 96	17.33	67.7	2	135	56.9	3	171	51.5	3	154
28x 96	18.67	72.9	2	146	61.3	3	184	55.4	3	166
30x 96	20.00	78.1	2	156	65.6	2	131	59.4	3	178
36x 96	24.00	93.8	2	188	78.8	2	158	71.3	2	143
24x108	18.00	70.3	2	141	59.1	3	177	53.4	3	160
26x108	19.50	76.2	2	152	64.0	2	128	57.9	3	174
28x108	21.00	82.0	2	164	68.9	2	138	62.3	2	125
30x108	22.50	87.9	2	176	73.8	2	148	66.8	2	134
36x108	27.00	105.5	*	*	88.6	2	177	80.2	2	160
24x120	20.00	78.1	2	156	65.6	2	131	59.4	3	178
26x120	21.67	84.6	2	169	71.1	2	142	64.3	2	129
28x120	23.33	91.1	2	182	76.6	2	153	69.3	2	139
30x120	25.00	97.7	2	195	82.0	2	164	74.2	2	148
36x120	30.00	117.2	*	*	98.4	*	*	89.1	2	178

Size Inches	Sq. Ft. per Sheet	Gauge No. 16			17			18		
		Wt., Lbs., per Sq. Ft. 2.656			2.406			2.156		
		Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x72	12.00	31.9	5	159	28.9	5	144	25.9	6	155
26x72	13.00	34.5	4	138	31.3	5	156	28.0	5	140
28x72	14.00	37.2	4	149	33.7	5	168	30.2	5	151
30x72	15.00	39.8	4	159	36.1	4	144	32.3	5	162
36x72	18.00	47.8	3	143	43.3	4	173	38.8	4	155
24x84	14.00	37.2	4	149	33.7	5	168	30.2	5	151
26x84	15.17	40.3	4	161	36.5	4	146	32.7	5	163
28x84	16.33	43.4	4	174	39.3	4	157	35.2	4	141
30x84	17.50	46.5	3	139	42.1	4	168	37.7	4	151

*Sheets weighing more than 98 pounds each, approximately, are not banded as general practice.

Galvanized Sheets

Table of Weights without Bands and Number of Sheets per Bundle, Square Feet and Weight of Sheets

Continued

Size Inches	Square Feet per Sheet	Gauge No. 16			17			18		
		Wt., Lbs., per Sq. Ft. 2.656			2.406			2.156		
		Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
36x 84	21.00	55.8	3	167	50.5	3	152	45.3	3	136
24x 96	16.00	42.5	4	170	38.5	4	154	34.5	4	138
26x 96	17.33	46.0	3	138	41.7	4	167	37.4	4	150
28x 96	18.67	49.6	3	149	44.9	4	180	40.3	4	161
30x 96	20.00	53.1	3	159	48.1	3	144	43.1	4	173
36x 96	24.00	63.8	2	128	57.8	3	173	51.8	3	155
24x108	18.00	47.8	3	143	43.3	3	130	38.8	4	155
26x108	19.50	51.8	3	155	46.9	3	141	42.0	4	168
28x108	21.00	55.8	3	167	50.5	3	152	45.3	3	136
30x108	22.50	59.8	3	179	54.1	3	162	48.5	3	146
36x108	27.00	71.7	2	143	65.0	2	130	58.2	3	175
24x120	20.00	53.1	3	159	48.1	3	144	43.1	3	129
26x120	21.67	57.5	3	173	52.1	3	156	46.7	3	140
28x120	23.33	62.0	3	186	56.1	3	168	50.3	3	151
30x120	25.00	66.4	2	133	60.2	3	180	53.9	3	162
36x120	30.00	79.7	2	159	72.2	2	144	64.7	2	129

Size Inches	Square Feet per Sheet	Gauge No. 19			20			21		
		Wt., Lbs., per Sq. Ft. 1.906			1.656			1.531		
		Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	22.9	7	160	19.9	8	159	18.4	8	147
26x 72	13.00	24.8	6	149	21.5	7	151	19.9	8	159
28x 72	14.00	26.7	6	160	23.2	7	162	21.4	7	150
30x 72	15.00	28.6	5	143	24.8	6	149	23.0	7	161
36x 72	18.00	34.3	4	137	29.8	5	149	27.6	6	165
24x 84	14.00	26.7	6	160	23.2	7	162	21.4	7	150
26x 84	15.17	28.9	5	145	25.1	6	151	23.2	7	163
28x 84	16.33	31.1	5	156	27.1	5	135	25.0	6	150
30x 84	17.50	33.4	5	167	29.0	5	145	26.8	6	161
36x 84	21.00	40.0	4	160	34.8	4	139	32.2	5	161
24x 96	16.00	30.5	5	153	26.5	6	159	24.5	6	147
26x 96	17.33	33.0	5	165	28.7	5	144	26.5	6	159
28x 96	18.67	35.6	4	142	30.9	5	155	28.6	5	143
30x 96	20.00	38.1	4	153	33.1	5	166	30.6	5	153
36x 96	24.00	45.8	3	137	39.8	4	159	36.8	4	147
24x108	18.00	34.3	4	137	29.8	5	149	27.6	5	138
26x108	19.50	37.2	4	149	32.3	5	161	29.9	5	149
28x108	21.00	40.0	4	160	34.8	4	139	32.2	5	161
30x108	22.50	42.9	3	129	37.3	4	149	34.5	4	138
36x108	27.00	51.5	3	154	44.7	3	134	41.3	4	165
24x120	20.00	38.1	4	153	33.1	5	166	30.6	5	153
26x120	21.67	41.3	4	165	35.9	4	144	33.2	5	166
28x120	23.33	44.5	3	133	38.6	4	155	35.7	4	143
30x120	25.00	47.7	3	143	41.4	4	166	38.3	4	153
36x120	30.00	57.2	3	172	49.7	3	149	45.9	3	138

Size Inches	Square Feet per Sheet	Gauge No. 22			23			24		
		Wt., Lbs., per Sq. Ft. 1.406			1.281			1.156		
		Wt. Lbs per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	16.9	9	152	15.4	10	154	13.9	11	153
26x 72	13.00	18.3	8	146	16.7	9	150	15.0	10	150
28x 72	14.00	19.7	8	158	17.9	8	144	16.2	9	146
30x 72	15.00	21.1	7	148	19.2	8	154	17.3	9	156
36x 72	18.00	25.3	6	152	23.1	7	161	20.8	7	146
24x 84	14.00	19.7	8	158	17.9	8	144	16.2	9	146
26x 84	15.17	21.3	7	149	19.4	8	155	17.5	8	140
28x 84	16.33	23.0	7	161	20.9	7	146	18.9	8	151
30x 84	17.50	24.6	6	148	22.4	7	157	20.2	7	142
36x 84	21.00	29.5	5	148	26.9	6	161	24.3	6	146
24x 96	16.00	22.5	7	158	20.5	7	144	18.5	8	148
26x 96	17.33	24.4	6	146	22.2	7	155	20.0	8	160
28x 96	18.67	26.3	6	158	23.9	6	144	21.6	7	151
30x 96	20.00	28.1	5	141	25.6	6	154	23.1	7	162
36x 96	24.00	33.8	5	169	30.8	5	154	27.8	6	167
24x108	18.00	25.3	6	152	23.1	7	161	20.8	7	146
26x108	19.50	27.4	5	137	25.0	6	150	22.5	7	158

Galvanized Sheets

Table of Weights without Bands and Number of Sheets per Bundle, Square Feet and Weight of Sheets

Concluded

		Gauge No.								
		22			23			24		
		Wt., Lbs., per Sq. Ft.								
		1.406			1.281			1.156		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
28x108	21.00	29.5	5	148	26.9	6	161	24.3	6	146
30x108	22.50	31.6	5	158	28.8	5	144	26.0	6	156
36x108	27.00	38.0	4	152	34.6	4	138	31.2	5	156
24x120	20.00	28.1	5	141	25.6	6	154	23.1	7	162
26x120	21.67	30.5	5	152	27.8	6	167	25.1	6	150
28x120	23.33	32.8	5	164	29.9	5	149	27.0	6	162
30x120	25.00	35.2	4	141	32.0	5	160	28.9	5	145
36x120	30.00	42.2	4	169	38.4	4	154	34.7	5	173

		Gauge No.								
		25			26			27		
		Wt., Lbs., per Sq. Ft.								
		1.031			.906			.844		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	12.4	12	149	10.9	14	152	10.1	15	152
26x 72	13.00	13.4	11	147	11.8	13	153	11.0	14	154
28x 72	14.00	14.4	11	159	12.7	12	152	11.8	13	154
30x 72	15.00	15.5	10	155	13.6	11	150	12.7	12	152
36x 72	18.00	18.6	8	149	16.3	9	147	15.2	10	152
24x 84	14.00	14.4	11	159	12.7	12	152	11.8	13	154
26x 84	15.17	15.6	10	156	13.7	11	151	12.8	12	154
28x 84	16.33	16.8	9	152	14.8	10	148	13.8	11	152
30x 84	17.50	18.0	8	144	15.9	10	159	14.8	10	148
36x 84	21.00	21.7	7	152	19.0	8	152	17.7	9	159
24x 96	16.00	16.5	9	149	14.5	10	145	13.5	11	149
26x 96	17.33	17.9	8	143	15.7	10	157	14.6	10	146
28x 96	18.67	19.3	8	154	16.9	9	152	15.8	10	158
30x 96	20.00	20.6	7	144	18.1	8	145	16.9	9	152
36x 96	24.00	24.8	6	149	21.8	7	152	20.3	8	162
24x108	18.00	18.6	8	149	16.3	9	147	15.2	10	152
26x108	19.50	20.1	8	161	17.7	8	141	16.5	9	148
28x108	21.00	21.7	7	152	19.0	8	152	17.7	8	142
30x108	22.50	23.2	7	162	20.4	7	143	19.0	8	152
36x108	27.00	27.8	5	139	24.5	6	147	22.8	7	159
24x120	20.00	20.6	7	144	18.1	8	145	16.9	9	152
26x120	21.67	22.3	7	156	19.6	8	157	18.3	8	146
28x120	23.33	24.1	6	144	21.1	7	148	19.7	8	158
30x120	25.00	25.8	6	155	22.7	7	159	21.1	7	148
36x120	30.00	30.9	5	155	27.2	6	163	25.3	6	152

		Gauge No.								
		28			29			30		
		Wt., Lbs., per Sq. Ft.								
		.781			.719			.656		
Size Inches	Square Feet per Sheet	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle	Wt. Lbs. per Sheet	Sheets per Bundle	Wt. Lbs. per Bundle
24x 72	12.00	9.4	16	150	8.6	17	147	7.9	19	150
26x 72	13.00	10.2	15	152	9.3	16	150	8.5	17	145
28x 72	14.00	10.9	14	153	10.1	15	151	9.2	16	147
30x 72	15.00	11.7	13	152	10.8	15	162	9.8	15	148
36x 72	18.00	14.1	11	155	12.9	12	155	11.8	13	154
24x 84	14.00	10.9	14	153	10.1	15	151	9.2	16	147
26x 84	15.17	11.8	13	154	10.9	14	153	10.0	15	149
28x 84	16.33	12.8	12	153	11.7	13	153	10.7	14	150
30x 84	17.50	13.7	11	150	12.6	12	151	11.5	13	149
36x 84	21.00	16.4	9	148	15.1	10	151	13.8	11	152
24x 96	16.00	12.5	12	150	11.5	13	150	10.5	15	158
26x 96	17.33	13.5	11	149	12.5	12	150	11.4	13	148
28x 96	18.67	14.6	10	146	13.4	11	148	12.3	12	147
30x 96	20.00	15.6	10	156	14.4	10	144	13.1	11	144
36x 96	24.00	18.8	8	150	17.3	9	155	15.8	10	158
24x108	18.00	14.1	11	155	12.9	12	155	11.8	13	154
26x108	19.50	15.2	10	152	14.0	11	154	12.8	12	154
28x108	21.00	16.4	9	148	15.1	10	151	13.8	11	152
30x108	22.50	17.6	8	141	16.2	9	146	14.8	10	148
36x108	27.00	21.1	7	148	19.4	8	155	17.7	8	142
24x120	20.00	15.6	10	156	14.4	10	144	13.1	11	144
26x120	21.67	16.9	9	152	15.6	10	156	14.2	11	156
28x120	23.33	18.2	8	146	16.8	9	151	15.3	10	153
30x130	25.00	19.5	8	156	18.0	9	162	16.4	9	148
36x120	30.00	23.4	7	164	21.6	7	151	19.7	8	158

Steel Sheets

Galvanized

When galvanized sheets are cut to special sizes, all waste accumulated in shearing is retained, unless order specifies that it be shipped. No allowance is made for scrap.

Minus sign indicates reduction from base price. All other prices are advance over base price.

Sheets 22 gauge and lighter are banded in bundles of approximately 150 pounds each.

No. 10

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
30x 96	**—$.50**	115.6	**42x 96**	**-$.45**	161.8
30x120	— **.50**	144.5	**42x120**	— **.45**	202.3
36x 96	— **.50**	138.8	**48x 96**	— **.30**	185.0
36x120	— **.50**	173.4	**48x120**	— **.30**	231.2

No. 12

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
30x 96	**—$.40**	90.6	**42x 96**	**—$.35**	126.8
30x120	— **.40**	113.3	**42x120**	— **.35**	158.7
36x 96	— **.40**	108.8	**48x 96**	— **.20**	145.0
36x120	— **.40**	135.9	**48x120**	— **.20**	181.2

No. 14

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
30x 96	**—$.30**	65.6	**42x 96**	**—$.25**	91.9
30x120	— **.30**	82.0	**42x120**	— **.25**	114.8
36x 96	— **.30**	78.8	**48x 96**	— **.10**	105.0
36x120	— **.30**	98.4	**48x120**	— **.10**	131.2

No. 16

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
24x 96	**—$.25**	42.5	**36x 96**	**—$.25**	63.8
24x120	— **.25**	53.1	**36x120**	— **.25**	79.7
28x 96	— **.25**	49.6	**42x 96**	— **.20**	74.4
28x120	— **.25**	62.0	**42x120**	— **.20**	93.0
30x 96	— **.25**	53.1	**48x 96**	— **.05**	85.0
30x120	— **.25**	66.4	**48x120**	— **.05**	106.2

No. 18

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
24x 96	**—$.15**	34.5	**30x 96**	**—$.15**	43.1
24x120	— **.15**	43.1	**30x120**	— **.15**	53.9
26x 96	— **.15**	37.4	**36x 96**	— **.15**	51.8
26x120	— **.15**	46.7	**36x120**	— **.15**	64.7
28x 72	— **.15**	30.2	**42x 96**	— **.10**	60.4
28x 84	— **.15**	35.2	**42x120**	— **.10**	75.5
28x 96	— **.15**	40.2	**48x 96**	+ **.10**	69.0
28x108	— **.15**	45.3	**48x120**	+ **.10**	86.2
28x120	— **.15**	50.3	......	......	....

No. 20

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
24x 96	**—$.10**	26.5	**28x144**	Base	46.4
24x120	— **.10**	33.1	**30x 96**	**—$.10**	33.1
26x 96	— **.10**	28.7	**30x120**	— **.10**	41.4
26x120	— **.10**	35.9	**36x 96**	— **.10**	39.8
28x 72	— **.10**	23.2	**36x120**	— **.10**	49.7
28x 84	— **.10**	27.1	**42x 96**	+ **.05**	46.0
28x 96	— **.10**	30.9	**42x120**	+ **.05**	58.0
28x108	— **.10**	34.8	**48x 96**	+ **.30**	53.0
28x120	— **.10**	38.6	**48x120**	+ **.30**	66.2

No. 22

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
24x 96	**—$.05**	22.5	**30x 96**	**—$.05**	28.1
24x120	— **.05**	28.1	**30x120**	— **.05**	35.2
26x 96	— **.05**	24.4	**36x 96**	— **.05**	33.8
28x 72	— **.05**	19.7	**36x120**	— **.05**	42.2
28x 84	— **.05**	23.	**42x 96**	+ **.30**	39.4
28x 96	— **.05**	26.2	**42x120**	+ **.30**	49.2
28x108	— **.05**	29.5	**48x 96**	+ **.60**	45.0
28x120	— **.05**	32.8	**48x120**	+ **.60**	56.2
28x144	+ **.05**	39.4	......	......	....

No. 24

Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet	Size Inches	Net Extra for Size	Est. Weight Pounds per Sheet
24x 96	Base	18.5	**28x144**	**+$.10**	32.4
24x120	Base	23.1	**30x 96**	Base	23.1
26x 96	Base	20.0	**30x120**	Base	28.9
26x120	Base	25.0	**36x 96**	Base	27.8
28x 72	Base	16.2	**36x120**	Base	34.7
28x 84	Base	18.9	**42x 96**	+ **.45**	32.4
28x 96	Base	21.6	**42x120**	+ **.45**	40.5
28x108	Base	24.3	**48x 96**	+ **.75**	37.0
28x120	Base	27.0	**48x120**	+ **.75**	46.2

Steel Sheets

Galvanized (Continued)

Size Inches	Net Extra for Size	Est. Wt., Pounds per Sheet	Size Inches	Net Extra for Size	Est. Wt., Pounds per Sheet
No. 26					
24x 96	**+$.25**	14.5	**28x144**	**+$.35**	25.4
24x120	**+ .25**	18.1	**30x 96**	**+ .25**	18.1
26x 96	**+ .25**	15.7	**30x120**	**+ .25**	22.7
26x120	**+ .25**	19.6	**30x144**	**+ .35**	27.3
28x 72	**+ .25**	12.7	**36x 96**	**+ .25**	21.8
28x 84	**+ .25**	14.8	**36x120**	**+ .25**	27.2
28x 96	**+ .25**	16.9	**42x 96**	**+ .90**	25.4
28x108	**+ .25**	19.	**42x120**	**+ .90**	31.7
28x120	**+ .25**	21.1	......	....	....
No. 27					
30x 96	**+$.35**	16.9	**36x 96**	**+$.40**	20.3
No. 28					
24x 96	**+$.50**	12.5	**28x120**	**+$.50**	18.2
24x120	**+ .50**	15.6	**28x144**	**+ .60**	21.8
26x 96	**+ .50**	13.5	**30x 96**	**+ .50**	15.6
26x120	**+ .50**	16.9	**30x120**	**+ .50**	19.5
28x 72	**+ .50**	10.9	**30x144**	**+ .60**	23.4
28x 84	**+ .50**	12.8	**36x 96**	**+ .70**	18.8
28x 96	**+ .50**	14.6	**36x120**	**+ .70**	23.4
28x108	**+ .50**	16.4	......	....	....
No. 30					
24x 96	**+$1.00**	10.5	**30x120**	**+$1.00**	16.4
24x120	**+ 1.00**	13.1	**36x 96**	**+ 1.20**	15.8
30x 96	**+ 1.00**	13.1	**36x120**	**+ 1.20**	19.7

Youngstown Copperoid Sheets

THE YOUNGSTOWN SHEET AND TUBE COMPANY
YOUNGSTOWN
COPPEROID
STEEL
YOUNGSTOWN, OHIO.

Youngstown Copperoid Sheets and Plates have been subjected to the corrosive action of atmosphere under actual service conditions for such an extended period of years and with such outstandingly favorable results that they are recommended to all users of steel sheets and plates who are confronted with unsolved problems of atmospheric corrosion.

In comparative service tests conducted over a period of more than 14 years, by the American Society for Testing Materials, Youngstown Copperoid has established a remarkable record of endurance under adverse service conditions. These tests were made at three different locations; one in an industrial section; another in a rural section; and another in a coastal location.

In each of these tests Youngstown Copperoid Sheets and Plates have withstood the ravages of atmospheric corrosion in a manner which recommends these remarkable sheets and plates for use where the resistance to atmospheric corrosion is a factor.

The quality of workability is another outstanding feature of Youngstown Copperoid Sheets and Plates. They are easy to form, stamp, draw, seam and weld. This special steel can be furnished in plates, hot rolled, hot rolled annealed, galvanized, galvannealed or formed into any standard style of roofing or siding.

Manufactured in all standard gages and in the regular widths and lengths for all gages.

Copper Amalgam Sheets

Cold Rolled and Annealed

Weight, 60 pounds per 12½ square feet. Thickness, .102 inches. Sizes 52x96 and 54x96.

Price based upon copper market.

Silver plating number of ounces, as specified.

Prices upon application.

Yoloy Steels

Yoloy Steels are a group of special problem steels of the Youngstown Sheet and Tube Company containing both nickel and copper, and possessing special superior physical properties of strength and toughness.

Contrasted with structural members of mild steels designed in heavy sections to give low unit stresses, Yoloy steels, with their higher permissible unit stresses, allow important reductions in dead weight without sacrifice of strength of load capacity. Used in the construction of railroad and motor transportation equipment, Yoloy high strength steels decrease dead weight, thereby reducing hauling costs and increasing earning capacity. Fabricating economies are also effected by reduction in amount of material handled.

Yoloy Steels are stronger than mild steels of the same carbon content. Unit stresses 50 per cent greater are permissible as a basis for calculation in design. The higher strength of Yoloy Steels is due to their chemical composition, and is not the result of heat treatment of special rolling practice.

Yoloy Steels have a 20 per cent greater impact resistance and the same hardness as carbon steels of the same tensile strength. The special nickel and carbon content also increases the resistance to abrasion and produces excellent fatique properties.

These steels lend themselves admirably to light weight construction involving either riveting or welding by the arc or gas processes. Yoloy welding rod, either bare or coated, and rivets are available.

Yoloy Steels are 4 to 6 times as resistant to atmospheric corrosion as carbon steels and 2 to 3 times as resistant as the ordinary copper bearing steels. They are finer grained due to the influences of both the nickel and the copper. These elements do not alloy with carbon; no compounds are formed which are detrimental to corrosion resistance or strength.

Summary of Physical Properties of Two Typical Steels in the Yoloy Series

		Low Strength Yoloy	High Strength Yoloy
Yield Point	lbs. per sq. in.	58000	73000
Tensile Strength	lbs. per sq. in.	74000	92000
Elongation in 2 In.	per cent	34	29
Elongation in 8 In.	per cent	29	22
Reduction of Area	per cent	70	57
Charpy Impact	ft. lbs.	40	35
Density	lbs. per cu. in.	0.283	0.283
Endurance Limit	lbs. per sq. in.	*45000	57000

Critical Transformation Temperatures

	Low Strength Yoloy	High Strength Yoloy
Ac1	**	1300° F.
Ac3	1510° F.	1455° F.
Ar1	....	1105° F.
Ar3	1240° F.	1275° F.

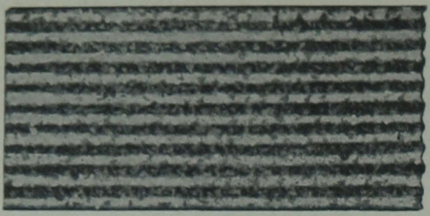
*Computed. Subject to upward revision upon completion of tests now under way.

**Drawing operations should be conducted below 1250° F.

The tabular values stated are for material in the normalized condition.

Corrugated Galvanized Steel Sheets

For Roofing and Siding



Corrugated sheets are the strongest form of sheet metal known, the load bearing strength being increased about nine times.

Expansion and contraction do not appreciably affect corrugated sheets, hence their widespread use as roofing and siding materials. They also have the advantages of lightness, rigidity and strength; they add considerable strength to the structure to which they are applied; and the fireproof feature is of decided importance in all types of buildings.

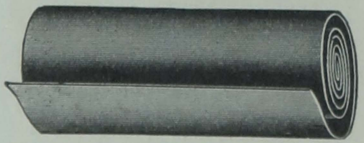
Ease of application and moderate cost are additional reasons for their use.

Full width, 26 inches; covering width, 24 inches when lapped one corrugation; depth of corrugations, approximately ½ inch; size corrugation, 2½ inches.

U.S. Std. Gage & Size Inches	No. Sq. Ft. per Sheet	Weight Pounds per Square	U.S. Std. Gage & Size Inches	No. Sq. Ft. per Sheet	Weight Pounds per Square
No. **20x26x 72**	13.00	178	No. **24x26x108**	19.50	125
26x 84	15.17	178	**26x120**	21.67	125
26x 96	17.33	178	**26x144**	26.00	125
26x108	19.50	178	No. **26x26x 72**	13.00	98
26x120	21.67	178	**26x 84**	15.17	98
26x144	26.00	178	**26x 96**	17.33	98
No. **22x26x 72**	13.00	151	**26x108**	19.50	98
26x 84	15.17	151	**26x120**	21.67	98
26x 96	17.33	151	**26x144**	26.00	98
26x108	19.50	151	No. **28x26x 72**	13.00	84
26x120	21.67	151	**26x 84**	15.17	84
26x144	26.00	151	**26x 96**	17.33	84
No. **24x26x 72**	13.00	125	**26x108**	19.50	84
26x 84	15.17	125	**26x120**	21.67	84
26x 96	17.33	125	**26x144**	26.00	84

Sheet Zinc

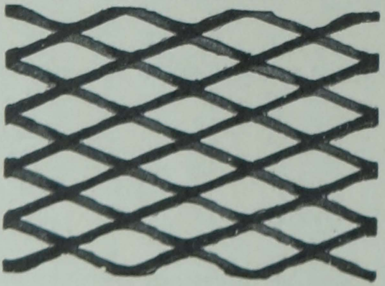
Sheets, 36x84 and 48x84 inches.



We carry zinc in various weights and will cut sizes to suit requirements.

Prices upon application.

Bostwick Niles Expanded Metal Lath



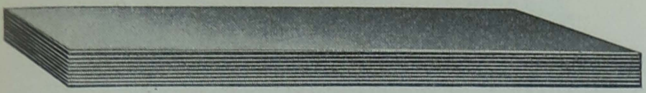
Manufactured in the weights standardized by the U.S. Department of Commerce, Simplified Practice Recommendation. Sheets are 24 inches wide and 96 inches long; a true oblong with straight sides. Weight per square yard: Painted, 2.2, 2.5, 3.0 and 3.4 pounds; galvanized, 2.5 and 3.4 pounds. Nine sheets in a bundle. Prices upon application.

Table Showing Square Feet of Corrugated Roofing

Sheets 26 Inches Wide Either 1¼, 2 or 2½-Inch Corrugations, in a Given Number of Sheets of a Given Length. No Allowance for Side or End Lap

No. Sheets	Length of Sheets, Feet						
	6	7	8	9	10	11	12
1	13	15	17	20	22	24	26
2	26	31	35	39	44	48	52
3	39	46	52	59	65	72	78
4	52	61	70	78	87	95	104
5	65	76	87	98	109	119	130
6	78	91	104	117	130	143	156
7	91	107	122	137	152	167	182
8	104	122	139	156	174	191	208
9	117	137	156	176	195	215	234
10	130	152	174	195	217	238	260
11	143	167	191	215	239	262	286
12	156	182	208	234	260	286	312
13	169	198	226	254	282	310	338
14	182	213	243	273	304	334	364
15	195	228	260	293	325	358	390
16	208	243	278	312	347	381	416
17	221	258	295	332	369	405	442
18	234	273	312	351	390	429	468
19	247	289	330	371	412	453	494
20	260	304	347	390	434	477	520
21	273	319	364	410	455	501	546
22	286	334	382	429	477	524	572
23	299	349	399	449	499	548	598
24	312	364	416	468	520	572	624
25	325	379	434	488	542	596	650
26	338	395	451	507	564	620	676
27	351	410	468	527	585	644	702
28	364	425	486	546	607	667	728
29	377	440	503	566	629	691	754
30	390	455	520	585	650	715	780
31	403	470	538	605	672	739	806
32	416	486	555	624	694	763	832
33	429	501	572	644	715	787	858
34	442	516	590	663	737	810	884
35	455	531	607	683	759	834	910
36	468	546	624	702	780	858	936
37	481	562	642	722	802	882	962
38	494	577	659	741	824	906	988
39	507	592	676	761	845	930	1014
40	520	607	694	780	867	953	1040
41	533	622	711	800	889	977	1066
42	546	637	728	819	910	1001	1092
43	559	653	746	839	932	1025	1118
44	572	668	763	858	954	1049	1144
45	585	683	780	878	975	1073	1170
46	598	698	798	897	997	1096	1196
47	611	713	815	917	1019	1120	1222
48	624	728	832	936	1040	1144	1248
49	637	744	850	956	1062	1168	1274
50	650	759	867	975	1084	1192	1300
51	663	774	884	995	1105	1216	1326
52	676	789	902	1014	1127	1239	1352
53	689	804	919	1034	1149	1263	1378
54	702	819	936	1053	1170	1287	1404
55	715	835	954	1073	1192	1311	1430
56	728	850	971	1092	1214	1335	1456
57	741	865	988	1112	1235	1359	1482
58	754	880	1006	1131	1257	1382	1508
59	767	895	1023	1151	1279	1406	1534
60	780	910	1040	1170	1300	1430	1560
61	793	926	1058	1190	1322	1454	1586
62	806	941	1075	1209	1344	1478	1612
63	819	956	1092	1229	1365	1502	1638
64	832	971	1110	1248	1387	1525	1664
65	845	986	1127	1268	1409	1549	1690
66	858	1001	1144	1287	1430	1573	1716
67	871	1017	1162	1307	1452	1597	1742
68	884	1032	1179	1326	1474	1621	1768
69	897	1047	1196	1346	1495	1645	1794
70	910	1062	1214	1365	1517	1668	1820
71	923	1077	1231	1385	1539	1692	1846
72	936	1092	1248	1404	1560	1716	1872
73	949	1108	1266	1424	1582	1740	1898
74	962	1125	1283	1443	1604	1764	1924
75	975	1138	1300	1463	1625	1788	1950
76	988	1153	1318	1482	1647	1811	1976
77	1001	1168	1335	1502	1669	1835	2002
78	1014	1183	1352	1521	1690	1859	2028
79	1027	1199	1370	1541	1712	1883	2054
80	1040	1214	1387	1560	1734	1907	2080
81	1053	1229	1404	1580	1755	1931	2106
82	1066	1244	1422	1599	1777	1954	2132
83	1079	1259	1439	1619	1799	1978	2158
84	1092	1274	1456	1638	1820	2002	2184
85	1105	1290	1474	1658	1842	2026	2210
86	1118	1305	1491	1677	1864	2050	2236
87	1131	1320	1508	1697	1885	2074	2262
88	1144	1335	1526	1716	1907	2097	2288
89	1157	1350	1543	1736	1929	2121	2314
90	1170	1365	1560	1755	1950	2145	2340
91	1183	1381	1578	1775	1972	2169	2366
92	1196	1396	1595	1794	1994	2193	2392
93	1209	1411	1612	1814	2015	2217	2418
94	1222	1426	1630	1833	2037	2240	2444
95	1235	1441	1647	1853	2059	2264	2470
96	1248	1456	1664	1872	2080	2288	2496
97	1261	1472	1682	1892	2102	2312	2522
98	1274	1487	1699	1911	2124	2336	2548
99	1287	1502	1716	1931	2145	2360	2574
100	1300	1517	1734	1950	2167	2383	2600

Stainless Steel Sheets

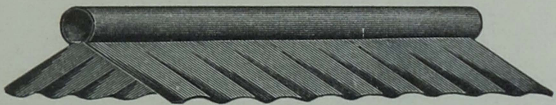


All No. 4 polish on one side and regular cold rolled finish on the other side.

Gage	Size Sheet Inches	Gage	Size Sheet Inches
20	30x 96	24	24x96
20	36x 96	24	30x96
20	36x120	24	36x96
22	30x 96	25	24x96
22	36x 96	25	30x96
22	36x120	26	36x96

Prices upon application.

Corrugated Ridge Roll

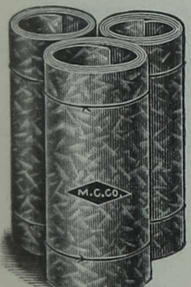


Formed from black, painted or galvanized sheets in 2½-inch roll to fit Eastern 1¼, Standard 1¼ and Standard 2½-inch corrugations—minimum girt 11 inches; and to fit Standard 3-inch corrugated, in 3-inch roll—minimum girt 12 inches.

The last three are made as long as 120 inches; the first 30 inches.

Galvanized Roll Valleys

Double Cross Locked



Furnished in 50 and 100-foot rolls.

Double locked furnished unless otherwise ordered.

Copper Alloy Steel, prices upon application.

Size Inches	Price, per Lineal Foot Gauge No. 29	28	26	24	Size Inches	Price, per Lineal Foot Gauge No. 29	28	26	24
10	$.19	$.20	.24	$.34	20	$.46	$.48	$.58	$.68
12	.24	.25	.31	.40	24	.60	.65	.70	.80
14	.30	.32	.40	.50	28	.70	.75	.80	1.00
16	.36	.38	.46	.56	30	.75	.80	.90	1.10

Carey Mica-Kote Roofing

Carey
Mica-Kote
Roofing

This roofing has a smooth surface with mica finish. Nails, cement and instructions furnished inside of each roll.

Rolls contain 108 square feet—sufficient to cover 100 square feet of roof area.

Approx. Wt. per Sq..lbs.	45	55	65
Per Roll...............	$1.95	2.25	2.70

Carey Bullseye Roofing

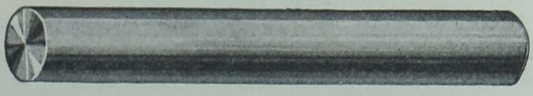
An economical, durable roofing for general utility purposes at low cost. It has a smooth surface; is easy to lay.

Nails, cement and instructions are included with each roll.

Rolls contain 108 square feet—sufficient to cover 100 square feet of roof area.

Approx. Wt. per Sq..........lbs.	35	45	55
Per Roll.....................	$1.25	1.60	1.85

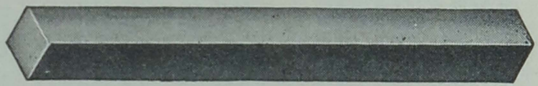
Round Brass Rod



Free Cutting—10 to 12-Foot Lengths

Diam. In.	Wt., Lbs. per Ft.	Diam. In.	Wt., Lbs. Per Ft.	Diam. In.	Wt., Lbs. Per Ft.
1/16	.01132	1 1/16	1.369	1 9/16	7.073
3/32	.02547	¾	1.630	1⅝	7.651
⅛	.04527	13/16	1.913	1¾	8.873
5/32	.07068	⅞	2.218	1⅞	10.19
3/16	.1019	15/16	2.546	1 15/16	10.88
7/32	.1385	1	2.897	2	11.59
¼	.1811	1 1/16	3.271	2⅛	13.08
9/32	.2291	1⅛	3.667	2¼	14.67
5/16	.2829	1 3/16	4.086	2⅜	16.34
⅜	.4074	1¼	4.527	2½	18.11
7/16	.5546	1 5/16	4.991	2¾	21.91
½	.7243	1⅜	5.478	3	26.08
9/16	.9167	1 7/16	5.987	3½	35.49
⅝	1.132	1½	6.519	4	46.36

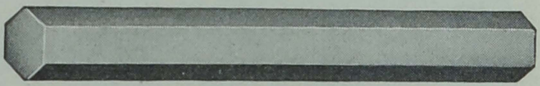
Square Brass Rod



Free Cutting—10 to 12-Foot Lengths

Size In.	Wt., Lbs. Per Ft.	Size In.	Wt., Lbs. Per Ft.	Size In.	Wt., Lbs. Per Ft.
⅛	.05764	½	.9222	1	3.689
3/16	.1297	9/16	1.167	1¼	5.764
¼	.2306	⅝	1.441	1½	8.300
5/16	.3602	¾	2.075	2	14.76
⅜	.5188	⅞	2.824	2½	23.06
7/16	.7061				

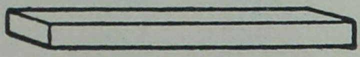
Hexagon Brass Rod



Free Cutting—10 to 12-Foot Lengths

Size In.	Wt., Lbs. Per Ft.	Size In.	Wt., Lbs. Per Ft.	Size In.	Wt., Lbs. Per Ft.
3/16	.1158	¾	1.8525	1⅜	6.226
¼	.2058	13/16	2.174	1 7/16	6.805
5/16	.3215	⅞	2.521	1½	7.409
⅜	.4631	15/16	2.894	1⅝	8.696
7/16	.6303	1	3.293	1¾	10.086
½	.8232	1 1/16	3.717	1⅞	11.58
9/16	1.0418	1⅛	4.168	2	13.17
⅝	1.2865	1¼	5.145	2¼	16.67
11/16	1.5565	1 5/16	5.673	2½	20.58

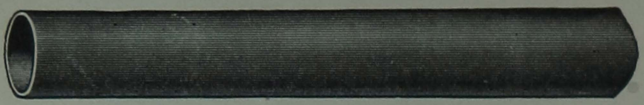
Rectangular Brass Rods



Size Inches	Size Inches	Size Inches	Size Inches	Size Inches	Size Inches
1/16x ¼	3/32x ½	⅛x ¾	3/16x1	¼x2	⅜x1¼
⅜	⅝	⅞	1¼	5/16x ½	1½
½	¾	1	1½	⅝	2
⅝	⅞	1¼	2	¾	½x ¾
¾	1	1½	¼x ⅜	1	1
⅞	1¼	2	½	1¼	1½
1	1½	3/16x ¼	⅝	1½	2
1¼	2	⅜	¾	2	......
1½	⅛x ¼	½	⅞	⅜x ½	......
2	⅜	⅝	1	⅝	......
3/32x ¼	½	¾	1¼	¾	......
⅜	⅝	⅞	1½	1	......

Seamless Brass and Copper Pipe

Standard Pipe Sizes



Regular

Std. Pipe Size Inches	Diameter, Inches Outside	Inside	Thick-ness Inches	Weight, per Foot Pounds Brass	Copper
⅛	.405	.281	.062	.246	.259
¼	.540	.375	.083	.437	.460
⅜	.675	.494	.091	.612	.643
½	.840	.625	.108	.911	.957
¾	1.050	.822	.114	1.240	1.300
1	1.315	1.062	.127	1.740	1.830
1¼	1.660	1.368	.146	2.560	2.690
1½	1.900	1.600	.150	3.040	3.200
2	2.375	2.062	.157	4.020	4.230
2½	2.875	2.500	.188	5.830	6.140
3	3.500	3.062	.219	8.310	8.750
3½	4.000	3.500	.250	10.850	11.410
4	4.500	4.000	.250	12.290	12.940
4½	5.000	4.500	.250	13.740	14.460
5	5.563	5.062	.250	15.400	16.210
6	6.625	6.125	.250	18.440	19.410
7	7.625	7.062	.282	23.920	25.170
8	8.625	8.000	.313	30.050	31.630
Extra Heavy					
⅛	.405	.205	.100	.353	.371
¼	.540	.294	.123	.593	.624
⅜	.675	.421	.127	.805	.847
½	.840	.542	.149	1.190	1.250
¾	1.050	.736	.157	1.620	1.710
1	1.315	.951	.182	2.390	2.510
1¼	1.660	1.272	.194	3.300	3.460
1½	1.900	1.494	.203	3.990	4.190
2	2.375	1.933	.221	5.510	5.790
2½	2.875	2.315	.280	8.410	8.840
3	3.500	2.892	.304	11.240	11.820
3½	4.000	3.358	.321	13.670	14.370
4	4.500	3.818	.341	16.410	17.250
4½	5.000	4.250	.375	20.070	21.100
5	5.563	4.813	.375	23.670	23.690
6	6.625	5.750	.437	31.320	32.930
7	7.625	6.625	.500	41.230	43.340
8	8.625	7.625	.500	47.020	49.420

Cutting to Exact Length Under 1 Foot

List Extra per Piece Over Price of Pipe

⅛, ¼ and ⅜ in.	½, ¾ and 1 in.	1¼, 1½ and 2 in.	2½ in.	3 in.	3½ in.	4 in.	4½ in.	5 in. and lgr.
$.01½	**.03**	**.04½**	**.07½**	**.10**	**.12**	**.13**	**.15**	**.18**

Cutting to exact lengths 1 foot to 20 feet, no charge.

Over 20 feet—random or exact lengths on sizes ⅛ to 4 in., no charge.

Exact lengths over 4 in. S.P.S. over 20 ft. long. . .per ft. **$.10**

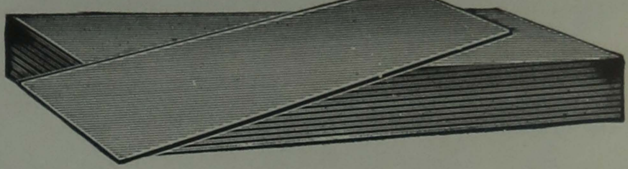
Extras for Finishings

Nominal Sizes Inches	Per Lineal Foot Tinning	Polishing	Nickel Plating	Chromium Plating	Per End Threading
⅛	**$.04**	**$.05½**	**$.07**	**$.12**	**$.09**
¼	**.06**	**.05½**	**.08½**	**.13**	**.09**
⅜	**.07½**	**.06**	**.09**	**.16**	**.09**
½	**.10**	**.06½**	**.10**	**.18**	**.09**
¾	**.10**	**.06½**	**.10**	**.21**	**.09**
1	**.10**	**.07**	**.11**	**.25**	**.09**
1¼	**.12**	**.08½**	**.13**	**.33**	**.12**
1½	**.13**	**.08½**	**.15**	**.49**	**.15**
2	**.18**	**.12**	**.17**	**.63**	**.21**
2½	**.27**	**.12**	**.19**	**.72**	**.30**
3	**.37**	**.15**	**.27**	**.87**	**.45**
3½	**.47**	**.18**	**.37**	**1.05**	**.60**
4	**.57**	**.21**	**.47**	**1.15**	**.60**
4½	**.62**	**.24**	**.57**	**1.21**	**.75**
5	**.67**	. . . .	**.66**	. . . .	**.90**
6	**.72**	. . . .	**.84**	. . . .	**1.35**

Stock lengths are all exactly 12 feet.

Sheet Copper

Hot Rolled



B & S Gauge No.	Size Sheets Inches	Wt., Oz. per Sq. Ft.	Wt., Lbs. per Sheet
30	30x60	7.0	5.7
28	30x60	9.5	7.5
26	30x60	12.0	9.2
24	30x96	15.0	18.0
22	30x96	18.0	23.0
20	30x96	24.0	29.0
18	30x96	29.0	27.0
16	30x96	38.0	47.0
14	30x96	47.0	59.0
12	30x60	60.0	47.0
10	30x60	75.0	59.0

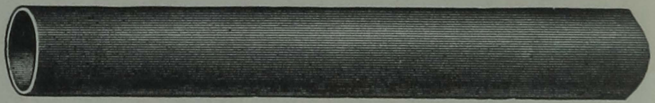
Thickness Inches	Size Sheets Inches	Wt., Oz. per Sq. Ft.	Wt., Lbs. per Sheet
⅛	30x60	94	74
³⁄₁₆	30x60	136	106
¼	30x60	192	150

Cold Rolled

Size sheets, 36x96 inches.

Weight per square foot: 14, 16, 18, 20, 24, 32 and 48 ounces.

Seamless Copper Tubing



¹⁄₃₂-Inch Wall

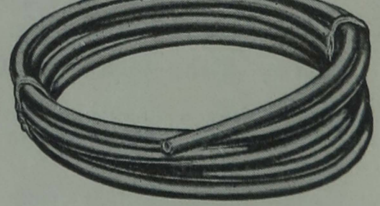
Outside diameter: ⁵⁄₁₆, ⅜, ⁷⁄₁₆, ½, ⅝, ¾, ⅞ and 1 inch.

¹⁄₁₆-Inch Wall

Outside diameter: ⅜, ½, ⅝, ¾, ⅞, 1, 1⅛, 1¼, 1½, 1¾ and 2 inches.

Seamless Copper Tubing

Annealed



Size Inches	Stubs' Gauge No.	Size Inches	Stubs' Gauge No.
⅛	20	⁷⁄₁₆	20
³⁄₁₆	20	½	20
¼	20	⅝	18
⁵⁄₁₆	20	¾	18
⅜	20	1	18

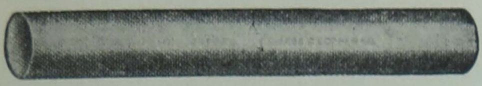
Dehydrated Copper Tubing

Annealed

Outside diameter: ¼, ⅜, ⁷⁄₁₆, ½ and ⅝ inch.

Sold in full lengths only, as the ends are sealed.

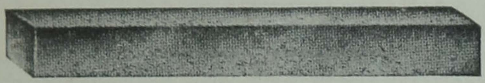
Round Copper Rod



10 to 12-Foot Lengths

Diam. In.	Wt., Lbs. per Ft.	Diam. In.	Wt., Lbs. per Ft.	Diam. In.	Wt., Lbs. per Ft.
1/4	.1894	3/4	1.705	1 5/8	8.002
5/16	.2959	7/8	2.320	1 3/4	9.281
3/8	.4261	1	3.030	2	12.12
7/16	.5800	1 1/8	3.835	2 1/4	15.34
1/2	.7576	1 1/4	4.735	2 1/2	18.94
9/16	.9588	1 3/8	5.729	3	27.27
5/8	1.184	1 1/2	6.818	...	......

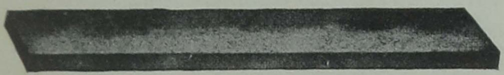
Square Copper Rod



10 to 12-Foot Lengths

Size In.	Wt., Lbs. per Ft.	Size In.	Wt., Lbs. per Ft.	Size In.	Wt., Lbs. per Ft.
1/4	.2412	3/4	2.170	1 1/2	8.681
3/8	.5426	7/8	2.954	2	15.43
1/2	.9646	1	3.858	2 1/2	24.12
5/8	1.507	1 1/4	6.029	...	......

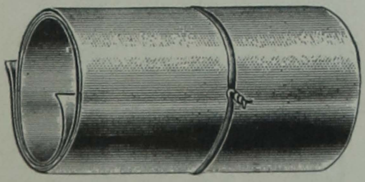
Flat Buss Bar Copper



10 to 12-Foot Lengths

Size In.	Wt., Lbs. per Ft.	Size In.	Wt., Lbs. per Ft.	Size In.	Wt., Lbs. per Ft.
1/16 x 3/8	.090	3/16 x 1 1/4	.9043	5/16 x 1 1/2	1.809
1/2	.1206	1 1/2	1.085	2	2.412
3/4	.1809	2	1.447	2 1/2	3.014
1	.2412	2 1/2	1.809	3	3.617
1 1/4	.3014	3	2.170	4	4.823
1 1/2	.3617	1/4 x 1/2	.4823	5	6.029
1/8 x 1/2	.2412	3/4	.7235	6	7.236
3/4	.3617	1	.9646	3/8 x 1 1/2	2.170
1	.4823	1 1/4	1.206	2	2.894
1 1/4	.6029	1 1/2	1.447	2 1/2	3.617
1 1/2	.7235	1 3/4	1.688	3	4.341
2	.9646	2	1.929	4	7.235
2 1/2	1.206	2 1/2	2.412	6	8.681
3	1.447	3	2.894	1/2 x 2	3.858
3/16 x 1/2	.3617	4	3.858	3	5.788
3/4	.5426	5	4.823	4	7.717
1	.7235	6	5.788	6	11.576

Shim Stock



Regular stock width in this material is 6 inches but it can be cut to any specified width.

Brass

Furnished in the following thicknesses:

.001-inch
.0015 “
.002-inch
.003 “
.004-inch
.005 “
.010-inch
.015 “

Steel

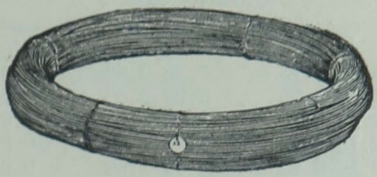
Furnished in the following thicknesses.

.002-inch
.003 “
.004 “
.005 “
.006 “
.007-inch
.008 “
.009 “
.010 “
.011 “
.012-inch
.013 “
.014 “
.015 “
.016 “
.017-inch
.018 “
....
....
....

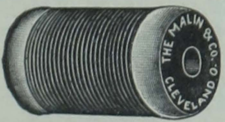
Prices upon application.

Soft Copper Wire

In Coils



Size: 3/8, 5/16, 1/4 and 3/16 inch.
B & S Gauge Nos. 6, 7, 8, 9, 10, 11, 12, 13, 14 and 16.
Also B & S Gauge Nos. 18 and 20 in 5-pound coils.


THE MALIN & CO.
CLEVELAND, O.

Stubs' Gauge No.	Per Spool	Stubs' Gauge No.	Per Spool
	1/2-Pound Spools		
16	$.36	22	$.42
17	.38	23	.43
18	.38	24	.44
19	.39	25	.45
20	.39	26	.46
21	.40	27	.48
	1/4-Pound Spools		
24	$.22	28	$.26
25	.23	29	.28
26	.23	30	.30
27	.24	32	.32

Nickel Silver Wire

18%—Spring Temper

1/2-Pound Spools

B & S Gauge Nos. 16, 18, 20, 22, 24 and 26.

1/4-Pound Spools

B & S Gauge Nos. 28, 30 and 32.

18%—In Coils

B & S Gauge Nos. 6, 8, 10, 12, 14, 16 and 18.

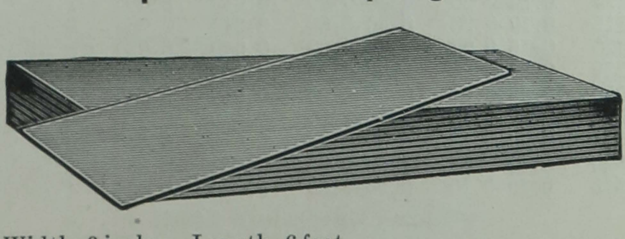
Nickel Silver Sheets

18%—8 Inches Wide

Patent Leveled—Jewelers Grade

B & S Gauge Nos. 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28 and 30.

Phosphor Bronze Spring Sheets



Width, 6 inches. Length, 6 feet.

B & S Gauge No.	Wt., Lbs. per Sq. Ft.	B & S Gauge No.	Wt., Lbs. per Sq. Ft
14	2.903	24	.911
16	2.303	26	.722
18	1.826	28	.573
20	1.448	30	.454
22	1.148	..	....

Phosphor Bronze Wire

1/2-Pound Spools

B & S Gauge Nos. 20, 22 and 24.

1/4-Pound Spools

B & S Gauge Nos. 26, 28, 30 and 32.

S.A.E. Steel Specifications

Chemical Compositions

Carbon Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.
1010	0.05–0.15	0.30–0.60	0.045	0.055
1015	0.10–0.20	0.30–0.60	0.045	0.055
X1015	0.10–0.20	0.70–1.00	0.045	0.055
1020	0.15–0.25	0.30–0.60	0.045	0.055
X1020	0.15–0.25	0.70–1.00	0.045	0.055
1025	0.20–0.30	0.30–0.60	0.045	0.055
X1025	0.20–0.30	0.70–1.00	0.045	0.055
1030	0.25–0.35	0.60–0.90	0.045	0.055
1035	0.30–0.40	0.60–0.90	0.045	0.055
1040	0.35–0.45	0.60–0.90	0.045	0.055
X1040	0.35–0.45	0.40–0.70	0.045	0.055
1045	0.40–0.50	0.60–0.90	0.045	0.055
X1045	0.40–0.50	0.40–0.70	0.045	0.055
1050	0.45–0.55	0.60–0.90	0.045	0.055
X1050	0.45–0.55	0.40–0.70	0.045	0.055
1055	0.50–0.60	0.60–0.90	0.040	0.055
X1055	0.50–0.60	0.90–1.20	0.040	0.055
1060	0.55–0.70	0.60–0.90	0.040	0.055
1065	0.60–0.75	0.60–0.90	0.040	0.055
X1065	0.60–0.75	0.90–1.20	0.040	0.055
1070	0.65–0.80	0.60–0.90	0.040	0.055
1075	0.70–0.85	0.60–0.90	0.040	0.055
1080	0.75–0.90	0.60–0.90	0.040	0.055
1085	0.80–0.95	0.60–0.90	0.040	0.055
1090	0.85–1.00	0.60–0.90	0.040	0.055
1095	0.90–1.05	0.25–0.50	0.040	0.055

Free Cutting Steels—Screw Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Range	Sulphur Range
1112	0.08–0.16	0.60–0.90	0.09–0.13	0.10–0.20
X1112	0.08–0.16	0.60–0.90	0.09–0.13	0.20–0.30
1115	0.10–0.20	0.70–1.00	0.045 Max.	0.075–0.15
1120	0.15–0.25	0.60–0.90	0.045 Max.	0.075–0.15
X1314	0.10–0.20	1.00–1.30	0.045 Max.	0.075–0.15
X1315	0.10–0.20	1.30–1.60	0.045 Max.	0.075–0.15
X1330	0.25–0.35	1.35–1.65	0.045 Max.	0.075–0.15
X1335	0.30–0.40	1.35–1.65	0.045 Max.	0.075–0.15
X1340	0.35–0.45	1.35–1.65	0.045 Max.	0.075–0.15

*Manganese Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.
T1330	0.25–0.35	1.60–1.90	0.040	0.050
T1335	0.30–0.40	1.60–1.90	0.040	0.050
T1340	0.35–0.45	1.60–1.90	0.040	0.050
T1345	0.40–0.50	1.60–1.90	0.040	0.050
T1350	0.45–0.55	1.60–1.90	0.040	0.050

*Nickel Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.	Nickel Range
2015	0.10–0.20	0.30–0.60	0.040	0.050	0.40–0.60
2115	0.10–0.20	0.30–0.60	0.040	0.050	1.25–1.75
2315	0.10–0.20	0.30–0.60	0.040	0.050	3.25–3.75
2320	0.15–0.25	0.30–0.60	0.040	0.050	3.25–3.75
2330	0.25–0.35	0.50–0.80	0.040	0.050	3.25–3.75
2335	0.30–0.40	0.50–0.80	0.040	0.050	3.25–3.75
2340	0.35–0.45	0.60–0.90	0.040	0.050	3.25–3.75
2345	0.40–0.50	0.60–0.90	0.040	0.050	3.25–3.75
2350	0.45–0.55	0.60–0.90	0.040	0.050	3.25–3.75
2515	0.10–0.20	0.30–0.60	0.040	0.050	4.75–5.25

*Nickel Chromium Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.	Nickel Range	Chromium Range
3115	0.10–0.20	0.30–0.60	0.040	0.050	1.00–1.50	0.45–0.75
3120	0.15–0.25	0.30–0.60	0.040	0.050	1.00–1.50	0.45–0.75
3125	0.20–0.30	0.50–0.80	0.040	0.050	1.00–1.50	0.45–0.75
3130	0.25–0.35	0.50–0.80	0.040	0.050	1.00–1.50	0.45–0.75
3135	0.30–0.40	0.50–0.80	0.040	0.050	1.00–1.50	0.45–0.75
3140	0.35–0.45	0.60–0.90	0.040	0.050	1.00–1.50	0.45–0.75
X3140	0.35–0.45	0.60–0.90	0.040	0.050	1.00–1.50	0.60–0.90
3145	0.40–0.50	0.60–0.90	0.040	0.050	1.00–1.50	0.45–0.75
3150	0.45–0.55	0.60–0.90	0.040	0.050	1.00–1.50	0.45–0.75
3215	0.10–0.20	0.30–0.60	0.040	0.050	1.50–2.00	0.90–1.25
3220	0.15–0.25	0.30–0.60	0.040	0.050	1.50–2.00	0.90–1.25
3230	0.25–0.35	0.30–0.60	0.040	0.050	1.50–2.00	0.90–1.25
3240	0.35–0.45	0.30–0.60	0.040	0.050	1.50–2.00	0.90–1.25
3245	0.40–0.50	0.30–0.60	0.040	0.050	1.50–2.00	0.90–1.25

S.A.E. Steel Specifications

Chemical Compositions

Continued

*Nickel Chromium Steels—Continued

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.	Nickel Range	Chromium Range
3250	0.45–0.55	0.30–0.60	0.040	0.050	1.50–2.00	0.90–1.25
3312	Max. 0.17	0.30–0.60	0.040	0.050	3.25–3.75	1.25–1.75
3325	0.20–0.30	0.30–0.60	0.040	0.050	3.25–3.75	1.25–1.75
3335	0.30–0.40	0.30–0.60	0.040	0.050	3.25–3.75	1.25–1.75
3340	0.35–0.45	0.30–0.60	0.040	0.050	3.25–3.75	1.25–1.75
3415	0.10–0.20	0.30–0.60	0.040	0.050	2.75–3.25	0.60–0.95
3435	0.30–0.40	0.30–0.60	0.040	0.050	2.75–3.25	0.60–0.95
3450	0.45–0.55	0.30–0.60	0.040	0.050	2.75–3.25	0.60–0.95

*Molybdenum Steels

S.A.E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulphur Max.	Chromium Range	Nickel Range	Molyb. Range
4130	0.25–0.35	0.50–0.80	0.040	0.050	0.50–0.80	....	0.15–0.25
X4130	0.25–0.35	0.40–0.60	0.040	0.050	0.80–1.10	....	0.15–0.25
4135	0.30–0.40	0.60–0.90	0.040	0.050	0.80–1.10	....	0.15–0.25
4140	0.35–0.45	0.60–0.90	0.040	0.050	0.80–1.10	....	0.15–0.25
4150	0.45–0.55	0.60–0.90	0.040	0.050	0.80–1.10	....	0.15–0.25
4340	0.35–0.45	0.50–0.80	0.040	0.050	0.50–0.80	1.50–2.00	0.30–0.40
4345	0.40–0.50	0.50–0.80	0.040	0.050	0.60–0.90	1.50–2.00	0.15–0.25
4615	0.10–0.20	0.40–0.70	0.040	0.050	....	1.65–2.00	0.20–0.30
4620	0.15–0.25	0.40–0.70	0.040	0.050	....	1.65–2.00	0.20–0.30
4640	0.35–0.45	0.50–0.80	0.040	0.050	....	1.65–2.00	0.20–0.30
4815	0.10–0.20	0.40–0.60	0.040	0.050	....	3.25–3.75	0.20–0.30
4820	0.15–0.25	0.40–0.60	0.040	0.050	....	3.25–3.75	0.20–0.30

*Chromium Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.	Chromium Range
5120	0.15–0.25	0.30–0.60	0.040	0.050	0.60–0.90
5140	0.35–0.45	0.60–0.90	0.040	0.050	0.80–1.10
5150	0.45–0.55	0.60–0.90	0.040	0.050	0.80–1.10
52100	0.95–1.10	0.20–0.50	0.030	0.035	1.20–1.50

*Chromium Vanadium Steels

S.A.E. No.	Carbon Range	Manganese Range	Phos. Max.	Sulphur Max.	Chromium Range	Vanadium	
						Min.	Desired
6115	0.10–0.20	0.30–0.60	0.040	0.050	0.80–1.10	0.15	0.18
6120	0.15–0.25	0.30–0.60	0.040	0.050	0.80–1.10	0.15	0.18
6125	0.20–0.30	0.60–0.90	0.040	0.050	0.80–1.10	0.15	0.18
6130	0.25–0.35	0.60–0.90	0.040	0.050	0.80–1.10	0.15	0.18
6135	0.30–0.40	0.60–0.90	0.040	0.050	0.80–1.10	0.15	0.18
6140	0.35–0.45	0.60–0.90	0.040	0.050	0.80–1.10	0.15	0.18
6145	0.40–0.50	0.60–0.90	0.040	0.050	0.80–1.10	0.15	0.18
6150	0.45–0.55	0.60–0.90	0.040	0.050	0.80–1.10	0.15	0.18
6195	0.90–1.05	0.20–0.45	0.030	0.035	0.80–1.10	0.15	0.18

*Tungsten Steels

S.A.E. No.	Carbon Range	Manganese Max.	Phos. Max.	Sulphur Max.	Chromium Range	Tungsten Range
71360	0.50–0.70	0.30	0.035	0.040	3.00–4.00	12.00–15.00
71660	0.50–0.70	0.30	0.035	0.040	3.00–4.00	15.00–18.00
7260	0.50–0.70	0.30	0.035	0.040	0.50–1.00	1.50 –2.00

*Silicon Manganese Steels

S.A.E. No.	Carbon Range	Manganese Range	Phosphorus Max.	Sulphur Max.	Silicon Range
9255	0.50–0.60	0.60–0.90	0.040	0.050	1.80–2.20
9260	0.55–0.65	0.60–0.90	0.040	0.050	1.80–2.20

Corrosion and Heat Resisting Alloys

S.A.E. No.	Carbon Max.	Manganese Max.	Silicon Max.	Phosphorus Max.	Sulphur Max.	Chromium Range
†30905	0.08	0.20–0.70	0.75	0.030	0.030	17.00–20.00
†30915	0.09–0.20	0.20–0.70	0.75	0.030	0.030	17.00–20.00
51210	0.12	0.60	0.50	0.030	0.030	11.50–13.00
51510	0.12	0.60	0.50	0.030	0.030	14.00–16.00
X51410	0.12	0.60	0.50	0.030	0.15–0.50	13.00–15.00
51335	0.25–0.40	0.60	0.50	0.030	0.030	12.00–14.00
51710	0.12	0.60	0.50	0.030	0.030	16.00–18.00

*Silicon range of all S.A.E. basic open hearth alloy steels shall be 0.15–0.30. For electric and acid open hearth alloy steels, the silicon content shall be 0.15 min.

†Nickel range, 8.00–10.00.

X-To indicate variations in the range of sulphur, manganese and chromium.

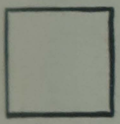
Cold Finished Steel

Net Extras for Standard Sizes Adopted August 26, 1935

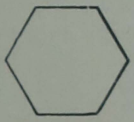
Rounds

Diam. In.	Wt. Lbs. per Ft.	Extras per 100 Lbs.	Diam. In.	Wt. Lbs. per Ft.	Extras per 100 Lbs.	Diam. In.	Wt. Lbs. per Ft.	Extras per 100 Lbs.
1/8	.042	$1.30	1 3/8	5.05	$.55	3 7/16	31.56	$1.00
5/32	.072	1.30	1 13/32	5.28	.55	3 1/2	32.71	1.00
3/16	.094	1.10	1 7/16	5.52	.55	3 9/16	33.90	1.00
7/32	.128	1.10	1 1/2	6.01	.60	3 5/8	35.09	1.00
1/4	.167	1.00	1 9/16	6.52	.60	3 11/16	36.31	1.00
5/16	.261	.90	1 5/8	7.05	.60	3 3/4	37.56	1.00
3/8	.376	.85	1 11/16	7.60	.60	3 13/16	38.74	1.15
7/16	.511	.85	1 3/4	8.18	.60	3 7/8	40.04	1.15
1/2	.668	.80	1 13/16	8.77	.60	3 15/16	41.34	1.15
17/32	.754	.80	1 27/32	9.08	.60	4	42.66	1.15
9/16	.845	.80	1 7/8	9.39	.60	4 3/16	46.83	1.25
5/8	1.043	.70	1 15/16	10.02	.60	4 1/4	48.24	1.25
11/16	1.262	.60	2	10.68	.60	4 3/8	51.11	1.25
23/32	1.379	.60	2 1/16	11.36	.65	4 7/16	52.58	1.25
47/64	1.440	.60	2 1/8	12.06	.65	4 1/2	54.07	1.35
3/4	1.50	.60	2 3/16	12.78	.65	4 3/4	60.25	1.35
13/16	1.76	.55	2 1/4	13.52	.65	4 7/8	63.46	1.35
53/64	1.83	.55	2 5/16	14.28	.65	4 15/16	65.10	1.45
27/32	1.90	.55	2 3/8	15.07	.65	5	66.76	1.45
7/8	2.04	.55	2 7/16	15.86	.65	5 1/4	73.60	1.45
29/32	2.19	.55	2 1/2	16.39	.65	5 3/8	......	1.45
59/64	2.27	.55	2 9/16	17.53	.80	5 7/16	......	1.95
15/16	2.35	.55	2 5/8	18.40	.80	5 1/2	80.77	1.95
31/32	2.51	.55	2 11/16	19.29	.80	5 3/4	88.29	1.95
1	2.67	.55	2 3/4	20.20	.80	5 7/8	92.17	1.95
1 1/32	2.84	.55	2 13/16	21.12	.80	5 15/16	94.14	2.40
1 1/16	3.01	.55	2 7/8	22.07	.80	6	96.14	2.40
1 1/8	3.38	.55	2 15/16	23.04	.80	6 1/16	98.14	2.40
1 5/32	3.57	.55	3	24.03	.80	6 3/16	102.20	2.40
1 3/16	3.77	.55	3 1/16	25.04	.90	6 5/16	106.40	2.40
1 7/32	3.97	.55	3 1/8	26.08	.90	6 3/8	108.5	2.40
1 1/4	4.17	.55	3 3/16	27.13	.90	6 7/16	112.8	3.25
1 9/32	4.38	.55	3 1/4	28.20	.90	7	130.9	3.25
1 5/16	4.00	.55	3 3/8	30.42	.90	7 1/16 to 8		3.75

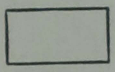
Squares, Hexagons and Flats



Square



Hexagon



Flat

Squares

Thickness Inches	Extras per 100 Pounds	Thickness Inches	Extras per 100 Pounds	Thickness Inches	Extras per 100 Pounds
1/8 to 5/32	$5.00	3/8 to 7/16	$1.75	1 3/8 to 2	$1.25
3/16 to 7/32	4.00	1/2 to 5/8	1.30	2 1/16 to 4	2.00
1/4 to 5/16	2.50	11/16 to 1 5/16	1.05	....	....

Hexagons

Thickness Inches	Extras per 100 Pounds	Thickness Inches	Extras per 100 Pounds	Thickness Inches	Extras per 100 Pounds
1/8 to 5/32	$5.00	5/8	$.70	1 15/16 to 2 3/16	$.75
3/16 to 7/32	4.00	11/16 to 13/16	.60	2 1/4 to 2 3/4	1.00
1/4 to 5/16	2.50	7/8 to 15/16	.55	2 13/16 to 3	1.50
3/8	1.75	1 to 1 1/16	.50	3 1/16 to 3 1/2	3.00
7/16	1.25	1 1/8 to 1 1/4	.45	3 9/16 to 4	4.00
1/2	.90	1 5/16 to 1 7/16	.50	....	....
9/16	.80	1 1/2 to 1 7/8	.60	....	....

Flats

Thickness Inches	Extras, per 100 Pounds — Width, Inches: 1/4	5/16 to 1/2	9/16 to 23/32	3/4 to 1	1 1/16 to 1 1/2	1 9/16 to 3	Wider than 3
1/8 and 5/32	$8.50	$6.50	$5.50	$4.50	$3.50	$3.00	$3.50
3/16 to 5/16	7.75	5.75	5.25	3.75	2.75	1.75	3.00
3/8 to 7/16	....	4.75	4.25	2.75	2.75	1.75	2.50
1/2 to 9/16	....	....	3.25	1.75	1.75	1.50	2.50
5/8 to 11/16	....	....	2.75	1.50	1.50	1.50	2.50
3/4 to 15/16	....	....	....	1.50	1.50	1.50	2.50
1 to 1 7/16	....	....	....	....	1.50	1.50	2.50
1 1/2 to 1 11/16	....	....	....	....	....	1.50	2.50
1 3/4 to 1 15/16	....	....	....	....	....	1.50	2.50
2 to 2 15/16	....	....	....	....	....	1.50	2.50

Quantity Extras Covering Round, Square, Hexagon and Flat Cold Drawn Steel

These extras apply on each size and grade released for shipment at one time to one destination.

Less than **300** Pounds, Extra	per 100 pounds	**$1.75**
300 to **499** Pounds, Extra	per 100 pounds	**1.00**
500 to **999** Pounds	per 100 pounds	**.25**
1000 Pounds and over	per 100 pounds	**No Extra**

SAE No. X 1112 Screw Stock

Our stock is a special cold finished round free cutting Bessemer screw stock, free and fast cutting, leaving an excellent finish, used for making screws, bolts, machine parts, etc. Carried in stock up to 1 15/16 inclusive.

SAE No. X 1020 Shafting

Stocked in sizes from 3/16 to 4 15/16 inches diameter.

This is an open hearth carborizing steel, possessing good machining qualities and adapted for shafting purposes.

Sizes 2 15/16 inches and larger are stocked in turned and polished grade. No advance in price for this quality.

Cutting Extras

Size Inches	Each	Size Inches	Each	Size Inches	Each
15/16	$.25	2 7/16	$.55	3 15/16	$1.30
1 3/16	.30	2 11/16	.65	4 3/16	1.50
1 7/16	.35	2 15/16	.70	4 7/16	1.60
1 11/16	.40	2 3/16	.90	4 11/16	1.70
1 15/16	.45	3 7/16	1.00	4 15/16	1.80
2 3/16	.50	3 11/16	1.20	.....	....

Extras for Chemical Composition

Per 100 Pounds

SCREW STOCK, BESSEMER— Standard Analysis (Sulphur Content Not higher than .100% Minimum, with 10-Point Range)	Base
SCREW STOCK, OPEN HEARTH— Standard Analysis (Sulphur Content .075% to .150%)	**$.10**
SCREW STOCK, BESSEMER OR OPEN HEARTH— Special Analysis (Sulphur Content .150% to .300%)	**.10**
SCREW STOCK, HIGH MANGANESE OPEN HEARTH— Not to Exceed .25% Carbon, Minimum Manganese .80%, Maximum 1.65%	**.20**
SCREW STOCK, HIGH MANGANESE OPEN HEARTH— Carbon .26% to .50%, Manganese, Minimum .80%, Maximum 1.65%	**.35**
S.A.E. SPECIFICATIONS—1010 to 1025, Inclusive, Including All Specifications Falling within the Same Carbon Range and Excepting High Manganese Specifications	Base
S.A.E. SPECIFICATIONS—1030 to 1050, Inclusive, Including All Specifications Falling within the Same Carbon Range and Excepting High Manganese Specifications	**.10**
SPECIFIED ANALYSIS—Carbon, .51% Mean to .75% Including Annealing	**1.50**
SPECIFIED ANALYSIS—Carbon, .76% Mean to 1.00% Including Annealing	**2.00**
SPECIFICATIONS—Guaranteed to McQuaid Ehn Test (In Addition to Extras for Chemistry)	**.60**
SELECTED QUALITY—To Meet Requirements of Chemistry, Soundness, Uniformity, Etc., Not Available in Commercial Steels (In Addition to Extras for Chemistry)	**.25**

Special Treatment Extras

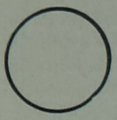
When Annealing or Normalizing Is Specified or Required to Meet Physical or Machinability Requirements or Is Necessary for Cold Drawing, Turning or Grinding	**$.75**
Annealing (Pipe or Pot)	**1.50**
Heat Treating	**1.50**

Standard Manufacturing Tolerances

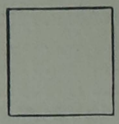
Cold Finished Steel Bars and Shafting

Rounds	.30% Carbon or Less	.31% to .50% Carbon
1″ or Under	.002″ Minus	.003″ Minus
1 1/16″ to **2″**, Inc	.003″ Minus	.004″ Minus
2 1/16″ to **4″**, Inc	.004″ Minus	.005″ Minus
4 1/16″ to **6″**, Inc	.005″ Minus	.006″ Minus
6 1/16″ to **7″**, Inc	.006″ Minus	.008″ Minus

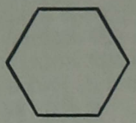
Weights of Round, Square and Hexagon Cold Finished Steel



Round



Square
For Keys, Splines
and Square Shafts



Hexagon
Special Steel
for Screws

Round						Square	
Size of Shaft Inches	Weight per Foot Pounds	Size of Shaft Inches	Weight per Foot Pounds	Size of Shaft Inches	Weight per Foot Pounds	Size of Shaft Inches	Weight per Foot Pounds
3/16	.09	1 5/32	3.57	3 1/16	25.04	3/16	.119
7/32	.13	1 3/16	3.77	3 1/8	26.08	1/4	.213
1/4	.17	1 7/32	3.97	3 3/16	27.14	9/32	.270
5/16	.26	1 1/4	4.17	3 1/4	28.21	5/16	.332
11/32	.31	1 9/32	4.38	3 5/16	29.30	11/32	.405
3/8	.37	1 5/16	4.60	3 3/8	30.42	3/8	.479
13/32	.44	1 3/8	5.05	3 7/16	31.56	7/16	.652
7/16	.51	1 13/32	5.28	3 1/2	32.72	1/2	.850
15/32	.59	1 7/16	5.52	3 9/16	33.90	9/16	1.08
1/2	.67	1 15/32	5.76	3 5/8	35.10	5/8	1.33
17/32	.75	1 1/2	6.01	3 11/16	36.32	11/16	1.67
9/16	.84	1 9/16	6.52	3 3/4	37.56	3/4	1.91
19/32	.94	1 5/8	7.05	3 13/16	38.81	13/16	2.25
5/8	1.04	1 11/16	7.60	3 7/8	40.12	7/8	2.60
41/64	1.10	1 3/4	8.18	3 15/16	41.41	15/16	2.99
21/32	1.15	1 13/16	8.77	4	42.73	1	3.40
43/64	1.20	1 27/32	9.08	4 1/8	45.44	1 1/16	3.84
11/16	1.26	1 7/8	9.39	4 3/16	46.84	1 1/8	4.31
23/32	1.38	1 15/16	10.03	4 1/4	48.24	1 1/4	5.32
47/64	1.44	2	10.68	4 3/8	51.12	1 3/8	6.43
3/4	1.50	2 1/16	11.36	4 7/16	52.60	1 1/2	7.65
25/32	1.63	2 1/8	12.06	4 1/2	54.09	1 5/8	8.98
51/64	1.70	2 3/16	12.78	4 5/8	57.12	1 3/4	10.42
13/16	1.76	2 1/4	13.52	4 11/16	58.69	2	13.61
53/64	1.83	2 5/16	14.28	4 3/4	60.27	2 1/4	17.22
27/32	1.90	2 3/8	15.07	4 7/8	63.46	2 1/2	21.26
7/8	2.04	2 7/16	15.87	4 15/16	65.12	2 3/4	25.72
29/32	2.19	2 1/2	16.69	5	66.77	3	30.61
59/64	2.28	2 9/16	17.54	5 1/4	73.60	3 1/4	35.93
15/16	2.35	2 5/8	18.40	5 1/2	80.80	3 1/2	41.67
31/32	2.51	2 11/16	19.29	5 3/4	88.29	3 3/4	47.84
1	2.67	2 3/4	20.20	6	96.13	4	54.42
1 1/32	2.84	2 13/16	21.13	6 1/4	104.31	...	.....
1 1/16	3.01	2 7/8	22.08	6 1/2	112.82	...	.....
1 3/32	3.19	2 15/16	23.05	6 3/4	121.67	...	.....
1 1/8	3.38	3	24.04	7	130.84	...	.....

Hexagon					
Size of Shaft Inches	Weight per Foot Pounds	Size of Shaft Inches	Weight per Foot Pounds	Size of Shaft Inches	Weight per Foot Pounds
1/4	.184	1 1/4	4.60	2 1/4	14.85
5/16	.29	1 5/16	5.07	2 5/16	15.80
3/8	.43	1 3/8	5.57	2 3/8	16.58
7/16	.56	1 7/16	6.07	2 7/16	17.50
1/2	.73	1 1/2	6.62	2 1/2	18.37
9/16	.93	1 9/16	7.17	2 9/16	19.35
5/8	1.15	1 5/8	7.76	2 5/8	20.25
11/16	1.40	1 11/16	8.37	2 11/16	21.25
3/4	1.66	1 3/4	9.00	2 3/4	22 25
13/16	1.91	1 13/16	9.65	2 13/16	23.28
7/8	2.25	1 7/8	10.32	2 7/8	24.31
15/16	2.58	1 15/16	11.00	2 15/16	25.38
1	2.94	2	11.70	3	26.45
1 1/16	3.33	2 1/16	12.51	3 1/8	28.50
1 1/8	3.73	2 1/8	13.27	....	.....
1 3/16	4.15	2 3/16	14.08	....	.....

Horsepower of Shafting

Transmission Shafts— Torsion Only $H.P. = \frac{D^3R}{50.5}$ $Kt = 1.0$ $Kb = 1.0$

Diam. Shaft In.	H.P. at Different R.P.M.								
	100	125	150	175	200	225	250	275	300
15/16	1.5	1.9	2.3	2.6	3.0	3.4	3.8	4.2	4.6
1 3/16	3.1	3.9	4.6	5.4	6.2	7.0	7.8	8.6	9.3
1 7/16	5.5	6.9	8.3	9.7	11.1	12.4	13.8	15.2	16.6
1 11/16	8.9	11.2	13.4	15.7	17.9	20.2	22.4	24.7	26.9
1 15/16	13.5	16.9	20.3	23.7	27.1	30.5	33.9	37.3	40.7
2 3/16	19.5	24.4	29.3	34.2	39.1	44.0	48.9	53.8	58.6
2 7/16	27.0	33.8	40.6	47.3	54.1	60.9	67.6	74.4	81.2
2 11/16	36.2	45.3	54.4	63.4	72.5	81.6	90.7	99.7	108.
2 15/16	47.3	59.2	71.0	82.9	94.7	106.	118.	130.	142.
3 7/16	75.9	94.9	113.	132.	151.	170.	189.	208.	227.
3 15/16	114.	142.	171.	199.	228.	256.	285.	313.	342.

Diam. Shaft. In.	H.P. at Different R.P.M.								
	350	400	450	500	550	600	700	800	900
15/16	5.3	6.1	6.9	7.7	8.4	9.2	10.7	12.3	13.8
1 3/16	10.9	12.5	14.0	15.6	17.2	18.7	21.9	25.0	28.1
1 7/16	19.4	22.2	24.9	27.7	30.5	33.3	38.8	44.4	49.9
1 11/16	31.4	35.9	40.4	44.9	49.4	53.8	62.8	71.8	80.8
1 15/16	47.5	54.3	61.1	67.9	74.7	81.5	95.1	108.	122.
2 3/16	68.4	78.2	88.0	97.8	107.	117.	136.	156.	176.
2 7/16	94.7	108.	121.	135.	148.	162.	189.	216.	243.
2 11/16	126.	145.	163.	181.	199.	217.	253.	290.	326.
2 15/16	165.	189.	213.	236.	260.	284.	331.	379.	426.
3 7/16	265.	303.	341.	379.	417.	455.	531.	607.	683.
3 15/16	399.	456.	513.	570.	627.	684.	798.	912.	1026.

Main Shafts $H.P. = \frac{D^3R}{133.7}$ $Kt = 1.0$ $Kb = 2.5$

Diam. Shaft In.	H.P. at Different R.P.M.								
	100	125	150	175	200	225	250	275	300
15/16	0.6	0.7	0.9	1.0	1.2	1.3	1.5	1.6	1.8
1 3/16	1.2	1.5	1.8	2.1	2.5	2.8	3.1	3.4	3.7
1 7/16	2.2	2.7	3.3	3.8	4.4	4.9	5.5	6.1	6.6
1 11/16	3.5	4.4	5.3	6.2	7.1	8.0	8.9	9.8	10.7
1 15/16	5.4	6.7	8.1	9.5	10.8	12.2	13.5	14.9	16.3
2 3/16	7.8	9.7	11.7	13.7	15.6	17.6	19.5	21.5	23.4
2 7/16	10.8	13.5	16.2	18.9	21.6	24.3	27.0	29.7	32.4
2 11/16	14.5	18.1	21.7	25.4	29.0	32.6	36.2	39.9	43.5
2 15/16	18.9	23.6	28.4	33.1	37.9	42.6	47.3	52.1	56.8
3 7/16	30.3	37.9	45.5	53.1	60.7	68.3	75.9	83.5	91.1
3 15/16	45.6	57.0	68.4	79.9	91.3	102.	114.	125.	136.
4 7/16	65.3	81.6	98.0	114.	130.	147.	163.	179.	196.
4 15/16	90.0	112.	135.	157.	180.	202.	225.	247.	270.
5 7/16	120.	150.	180.	210.	240.	270.	300.	330.	360.
5 15/16	156.	195.	234.	273.	313.	352.	391.	430.	469.
6 1/2	205.	256.	308.	359.	410.	462.	513.	564.	616.
7	256.	320.	384.	448.	513.	577.	641.	705.	769.
7 1/2	315.	394.	473.	552.	631.	709.	788.	867.	946.
8	382.	478.	574.	670.	765.	861.	957.	1053.	1148.
8 1/2	459.	574.	688.	803.	918.	1033.	1148.	1263.	1377.
9	545.	681.	817.	954.	1090.	1226.	1363.	1499.	1635.
9 1/2	641.	801.	961.	1122.	1282.	1442.	1603.	1763.	1923.
10	747.	934.	1121.	1308.	1495.	1682.	1869.	2056.	2243.

Diam. Shaft In.	H.P. at Different R.P.M.								
	350	400	450	500	550	600	700	800	900
15/16	2.1	2.4	2.7	3.0	3.3	3.6	4.3	4.9	5.5
1 3/16	4.3	5.0	5.6	6.2	6.8	7.5	8.7	10.1	11.2
1 7/16	7.7	8.8	9.9	11.1	12.2	13.3	15.5	17.7	19.9
1 11/16	12.5	14.3	16.1	17.9	19.7	21.5	25.1	28.7	32.3
1 15/16	19.0	21.7	24.4	27.1	29.9	32.6	38.0	43.5	48.9
2 3/16	27.4	31.3	35.2	39.1	43.0	46.9	54.8	62.6	70.4
2 7/16	37.9	43.3	48.7	54.1	59.5	64.9	75.8	86.6	97.4
2 11/16	50.8	58.0	65.3	72.5	79.8	87.1	101.	116.	130.
2 15/16	66.3	75.8	85.3	94.7	104.	113.	132.	151.	170.
3 7/16	106.	121.	136.	151.	167.	182.	212.	243.	273.
3 15/16	159.	182.	205.	228.	251.	273.	319.	365.	410.
4 7/16	228.	261.	294.	326.	359.	392.	457.	522.	588.
4 15/16	315.	360.	405.	450.	495.	540.	630.	720.	810.
5 7/16	420.	480.	541.	601.	661.	721.	841.	961.	1082.
5 15/16	547.	626.	704.	782.	861.	939.	1095.	1252.	1409.
6 1/2	718.	821.	924.	1027.	1129.	1232.	1437	1643.	1848.
7	897.	1026.	1154.	1282.	1410.	1539.	1795.	2052.	2308.
7 1/2	1104.	1262.	1419.	1577.	1735.	1893.	2208.	2524.	2839.
8	1340.	1531.	1723.	1914.	2106.	2297.	2680.	3063	3446.
8 1/2	1607.	1837.	2066.	2296.	2526.	2755.	3215.	3674.	4133.
9	1908.	2181.	2453.	2726.	2998.	3271.	3816.	4362.	4907.
9 1/2	2244.	2565.	2885.	3206.	3526.	3847.	4488.	5130.	5771.
10	2617.	2991.	3365.	3739.	4113.	4487.	5235.	5983.	6731.

Coppered Bessemer Steel Rods

Round

4-Foot Lengths

Diameter Inches	Per Pound	Diameter Inches	Per Pound	Diameter Inches	Per Pound
1/16	$.16	7/32	$.12	3/8	$.12
3/32	.15	1/4	.12	13/32	.14
1/8	.14	9/32	.12	7/16	.12
5/32	.13	5/16	.12	15/32	.14
3/16	.12	11/32	.14	1/2	.12

Black Oil Tempered Spring Steel

Thickness		Per Pound				
		Width, Inches				
Inches	Gauge	1/8	3/16	1/4	5/16	3/8
.018	26	$1.20	$1.20	$1.20	$1.00	$1.00
.022	24	1.20	1.20	1.20	1.00	1.00
.028	22	1.20	1.20	1.20	1.00	1.00
.035	20	1.20	1.20	1.20	1.00	1.00
.049	18	....	....	1.20	1.00	1.00
.065	16	....	....	1.20	1.00	1.00

Thickness		Per Pound					
		Width, Inches					
Inches	Gauge	1/2	5/8	3/4	1	1 1/4	1 1/2
.018	26	$1.00	$1.00	$1.00	.....	.....	.....
.022	24	1.00	1.00	1.00	$1.00	.....	.....
.028	22	1.00	1.00	1.00	1.00	.....	.....
.035	20	1.00	1.00	1.00	1.00	$1.00	$1.00
.049	18	1.00	1.00	1.00	1.00	....	....
.065	16	1.00	1.00	1.00	1.00	1.00	1.00

3/16-Inch x .020 Electric Fish Wire........per pound $1.20

Round Polished Drill Rods

3-Foot Lengths

Size Inches	Per Pound	Size Inches	Per Pound	Size Inches	Per Pound
1/16	$2.25	5/16	$.60	9/16	$.55
5/64	1.75	21/64	.60	19/32	.55
3/32	1.75	11/32	.60	5/8	.55
7/64	1.45	23/64	.60	21/32	.55
1/8	1.30	3/8	.60	11/16	.55
9/64	1.15	25/64	.60	23/32	.55
5/32	1.05	13/32	.60	3/4	.55
11/64	1.05	27/64	.60	25/32	.55
3/16	.85	7/16	.60	13/16	.55
13/64	.80	29/64	.60	27/32	.55
7/32	.75	15/32	.60	7/8	.55
15/64	.70	31/64	.60	29/32	.55
1/4	.65	1/2	.55	15/16	.55
17/64	.65	33/64	.55	31/32	.55
9/32	.65	17/32	.55	1	.55
19/64	.65	35/64	.55	....	...

Drill Rods

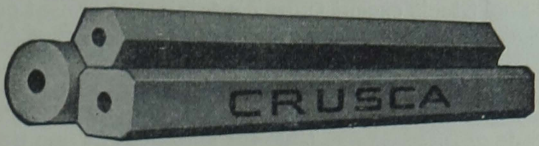
Size Drill Gauge	Per Pound	Size Drill Gauge	Per Pound	Size Drill Gauge	Per Pound
1 to 3	$.75	22 to 27	$1.15	47 to 52	$2.25
4 to 6	.80	28 to 30	1.30	53 to 55	2.75
7 to 12	.85	31 to 34	1.45	56 to 59	3.50
13 to 17	.95	35 to 41	1.60	60	5.00
18 to 21	1.05	42 to 46	1.75	....	....

Square Drill Rods

Size Inches	Per Pound	Size Inches	Per Pound	Size Inches	Per Pound
1/16	$4.50	7/32	$1.50	3/8	$1.20
3/32	3.50	1/4	1.30	13/32	1.20
1/8	2.60	9/32	1.30	7/16	1.20
5/32	2.10	5/16	1.20	1/2	1.10
3/16	1.70	11/32	1.20	...	....

Mining and Rock Drill Steels

Solid and Hollow

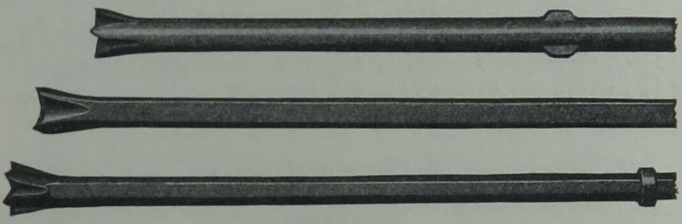


Hollow Drill Steel

Crusca New Process Hollow Drill Steel is widely used by contractors and outstanding mining companies—evidence of its superior qualities for drilling speed, utmost footage and minimum breakage.

Used on big jobs where drilling is done on an extensive scale and where costs are carefully checked.

This steel withstands vibration and shock to a high degree and hence there is less breakage of drills on the job.



Drill Bits

These steels are made in all standard shapes, as follows:

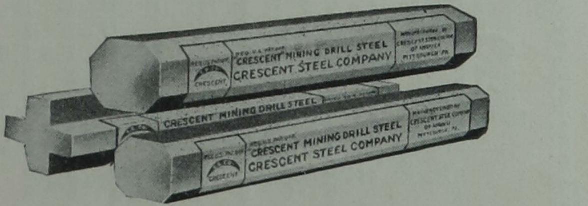
Hollow drill steel—rounds, hexagons, octagons and quarter octagons.

Solid drill steel—rounds, hexagons, octagons and quarter octagons.

Prices upon application.

Solid Drill Steel

Keystone, Canton Extra, C. H. C. Buckeye Crescent


CRESCENT MINING DRILL STEEL
CRESCENT STEEL COMPANY
CRESCENT MINING DRILL STEEL
CRESCENT MINING DRILL STEEL
CRESCENT STEEL COMPANY

Crescent grades for mining drill purposes give long service and eliminate losses caused by breakages and frequent redressings. Will not crystallize in service. Made in all standard shapes—rounds, octagons and hexagons. also we can furnish an extensive line of grooved sections.

Prices upon application.

Simplex Forging Steel

A high quality small furnace chrome nickel steel, heat-treated and annealed to a machinable degree to show high physical properties for highly stressed parts on which there is considerable machine work to be done. Suitable for axles, gears, pinions, short shafts, bolts, studs, etc.

Stock sizes, rounds: 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 1 7/8, 2, 2 1/4, 2 1/2, 2 3/4, 3, 3 1/4, 3 1/2, 3 3/4, 4, 4 1/4, 4 1/2, 4 3/4 and 5 inches.

"B" Machinery Steel

The standard carbon range of this steel is .33 to .40.

An easy machining steel of a medium carbon. Can be supplied in either guide rolled or planished finish.

Physical properties, natural condition: Elastic limit, 45000–55000 pounds; ultimate strength, 75000–85000 pounds.

Stock sizes, rounds: 1/2, 5/8, 3/4, 13/16, 7/8, 1, 1 1/8, 1 3/16, 1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 1 7/8, 2, 2 1/8, 2 1/4, 2 3/8, 2 1/2, 2 5/8, 2 3/4, 3, 3 1/4 and 3 1/2 inches.

Standard Classification of Carbon and Low Alloy Tool Steel Extras

For Tool Steels except those containing 3 per cent or more of Tungsten or Molybdenum or 8 per cent or more of Chromium, with or without additional alloys.

Extras for Quantity

These extras are applicable to individual items of a size and grade ordered at one time for shipment at one time.

Wt. Lbs.	Extra per Lb.	Wt. Lbs.	Extra per Lb.	Wt. Lbs.	Extra per Lb.
1000 of a		400 to 499	$.01	50 to 99	$.04½
Size or Over	Base	300 to 399	.01½	25 to 49	.06
750 to 999	$.00¼	200 to 299	.02½	Under 25	.07½
500 to 749	.00½	100 to 199	.03½	....	....

Round, Octagon and Hexagon

All intermediate sizes take next higher extra.
Base sizes 1½ to 2¾ inches inclusive.

Size Inches	Extra per Lb.	Size Inches	Extra per Lb.	Size Inches	Extra per Lb.
¼ and 9/32	$.05	1½ to 2¾	Base	7⅛ to 8	$.03¾
5/16 and 11/32	.04	2 13/16 to 3	$.00½	8⅛ to 9	.03
⅜ to 15/32	.03	3⅛ to 4	.01	9⅛ to 10	.02½
½ to 19/32	.02	4⅛ to 5	.02	10⅛ to 12	.02
⅝ to 31/32	.01	5⅛ to 6	.04	....	.....
1 to 1 15/32	.00½	6⅛ to 7	.04½	....	.....

Squares and Flats

Intermediate sizes take the next higher extra.

Width Section Inches	Extras in Cents per Pound — Thickness of Section, Inches ⅛	3/16	¼	5/16	⅜	½	⅝	¾	1	1¼	1½	1¾	2	2½	3
¼	30	20	10	..	..	..	..	..	..	..	..	..	..	..	..
5/16	25	15	8	6.5	..	..	..	..	..	..	..	..	..	..	..
⅜	20	10	6	5	4	..	..	..	..	..	..	..	..	..	..
½	10	7	5	4	3	2	2	..	..	..	..	..	..	..	..
¾	7	5	4	3	2	1.5	1	1	..	..	..	..	..	..	..
1	6	4	3	2	1.5	1	0.5	0.5	0.5	..	..	..	..	..	..
1¼	5	3	2	1.5	1	1	0.5	0.5	0.5	0.5	..	..	..	..	..
1½	5	3	1.5	1	1	0.5	B	B	B	B	B	..	..	..	..
1¾	5	3	1.5	1	1	0.5	B	B	B	B	B	B	..	..	..
2	5	3	1.5	1	1	0.5	B	B	B	B	B	B	B	..	..
2¼	5	3	1.5	1	1	0.5	B	B	B	B	B	B	B	..	..
2½	5	3	1.5	1	1	0.5	B	B	B	B	B	B	B	B	..
3	5	3	1.5	1	1	0.5	B	B	B	B	B	1	1	1	1
4	5	3	1.5	1	1	1	1	1	1	1	1	1.5	1.5	1.5	1.5
5	6	4	2.5	2	2	2	2	2	2	2	2	2	2	2	2
6	8	6	4.0	3.5	3	3	3	3	3	2.5	2.5	2.5	2.5	2.5	2.5
7	10	8	6	5	4	3	3	3	3	2.5	2.5	2.5	2.5	2.5	2.5
8	..	..	..	6	5	4	4	4	3.5	3	2.5	2.5	2.5	2.5	2.5
9	..	..	..	..	..	5	5	5	4	3.5	3	3	3	3	3
10	..	..	..	..	..	6	6	6	4.5	3.5	3	3	3	3	3
11	..	..	..	..	..	7	7	7	5	4	3.5	3.5	3.5	3.5	3.5
12	..	..	..	..	..	8	8	8	5.5	4.5	4	4	4	4	4

Extras for Machine Cutting and for Wastage

Rounds up to 2 In. Inc., All Squares, Flats and Other Shapes

Length of Cut Inches	Per Lb.	Length of Cut Inches	Per Lb.
¼ to under 5/16	$.46	2 to under 2¼	$.09
5/16 to under ⅜	.43	2¼ to under 2½	.08
⅜ to under 7/16	.40	2½ to under 2¾	.07
7/16 to under ½	.37	2¾ to under 3	.06½
½ to under 9/16	.34	3 to under 3¼	.06
9/16 to under ⅝	.31	3¼ to under 3½	.05½
⅝ to under 11/16	.28	3½ to under 3¾	.05
11/16 to under ¾	.26	3¾ to under 4	.04½
¾ to under ⅞	.24	4 to under 5	.04
⅞ to under 1	.20	5 to under 6	.03½
1 to under 1⅛	.18	6 to under 7	.03½
1⅛ to under 1¼	.16	7 to under 8	.03
1¼ to under 1⅜	.14	8 to under 10	.02½
1⅜ to under 1½	.13	10 to under 14	.02
1½ to under 1⅝	.12	14 to under 24	.02
1⅝ to under 1¾	.11	24 to under 36	.02
1¾ to under 1⅞	.10	36 to under 120	.02½
1⅞ to under 2	.09½	120 and over	.01

Annealing

Annealing.................................per pound $.01½

Tool Steels

Crescent Tool Steel

For general purposes such as mine drills, quarry tools, hammers, wedges, moils, blacksmiths' tools, etc.

Crescent Extra Tool Steel

An extra fine quality grade especially recommended for cold chisels, cold cutters, cold sets, boilermakers' snaps, granite points, woodworking and many other kinds of edge tools, etc.

Crescent Special Tool Steel

A special steel recommended for expensive tools such as milling and all circular cutters, minting and all engraved dies, cutting dies, knives, stamping dies, screw cutting dies, reamers, planer tools, etc.

Alva Extra and Alva Special Steel

Vanadium Tool Steels of extra fine quality, especially recommended for mining drills, cold chisels, cold cutters, cold sets, boilermakers' snaps, and all tools subject to shock or breakage from crystallization or vibration.

First Quality Crescent Sheet Spring Tool Steel

English Gauge Nos. 12, 14, 16, 18, 20, 22, 24, 26, 28 and 30. In sheets 18 inches wide and 5 feet long.

Max-el Number Two Special Machinery Steel

A perfect machining analysis. Carbon is approx. .40% with high manganese, small melt from acid O.H. furnace.

Sizes range from ¼ to 2⅜ inches round inclusive by 16ths; 2½ to 5 inches round inclusive by 8ths; 5 to 8 inches round inclusive by 4ths.

Hot rolled and machine straightened.

Crescent H.C. Pick Steel

A high carbon steel suitable for picks, hand tools, etc. Carried in squares ½, 9/16, 1⅛-inch and in flats ½, ⅝ and ¾-inch thickness by 1, 1⅛, 1¼ and 1½-inch widths. All sizes furnished in 16-foot random lengths.

Ball, Rod and Pebble Mill Grinding Media

Balls

The successful and economical operation of ore reduction mills requires careful attention to the selection of that crushing or grinding medium which will render the most efficient service, and at the lowest cost per ton of products.

For coarse products, large diameter balls, due to their greater weights, will do more crushing than smaller diameter balls. Diameters, weights and exact proportions of balls of various sizes to be used in initial or replenishing charges is a problem to be worked out in each individual case and depends largely on character of material to be crushed.

Size In.	Wt. Lbs. per Cu. Ft.	Wt. Lbs. per Ball	No. per Net Ton	No. per Keg	Weight Full Keg Pounds
2	289	1.18	1690	155	186
2½	284	2.31	860	82	181
3	260	4.00	505	42	168
3½	255	6.34	315	29	163
4	248	9.48	211	17	159
4½	246	13.50	148	12	158
5	211	18.53	108	8	143

Grinding Rods

For rod mill grinding, high carbon, hot rolled and machine straightened steel rods are available. The initial charge of rods is, as a rule, a mixed one, ranging from 1½ to 3 inches in diameter. Renewals are made with the maximum size which has been settled upon as most suitable for the work.

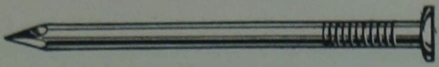
Size Diameter................	inches	1½	2	2½	3
Weight per Foot..............	pounds	6	10½	16¾	24

Flint Pebbles

Flint pebbles are used in pebble mills instead of metal balls. These pebbles are usually imported, the best coming from Denmark. They range in size from 1 to 8 inches and are used in the mill in proportions of different sizes, depending upon work to be done.

Size No. of Pebble	Approx. Diam. Inches	Approx. Wt. per Pebble Lbs.	No. per Long Ton of 2240 Lbs.	Size No. of Pebble	Approx. Diam. Inches	Approx. Wt. per Pebble, Lbs.	No. per Long Ton of 2240 Lbs.
1	1 to 1¾	.18	12440	4	3½ to 5	5	448
2	1¾ to 2⅜	1.00	2240	5	5 to 6½	8	280
3	2½ to 3¼	3.50	640	6	6½ to 8	10	224

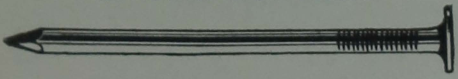
Common Nails



Size	Extra Over Base	Length Inches	Gage No.	Approx. No. to Lb.	Size	Extra Over Base	Length Inches	Gage No.	Approx. No. to Lb.
2d	$1.65	1	15	876	10d	$.40	3	9	69
3d	1.15	1¼	14	568	12d	.35	3¼	9	63
4d	.80	1½	12½	316	16d	.30	3½	8	49
5d	.70	1¾	12½	271	20d	.25	4	6	31
6d	.60	2	11½	181	30d	.25	4½	5	24
7d	.55	2¼	11½	161	40d	.25	5	4	18
8d	.50	2½	10¼	106	50d	.25	5½	3	14
9d	.45	2¾	10¼	96	60d	.25	6	2	11

Extra for Barbed Common Nails.......per 100 pounds **$.25**

Smooth Box Nails



Size	Length Inches	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base
2d	1	15½	1010	**$1.65**
3d	1¼	14½	635	**1.15**
4d	1½	14	473	**1.00**
5d	1¾	14	406	**.90**
6d	2	12½	236	**.65**
7d	2¼	12½	210	**.60**
8d	2½	11½	145	**.55**
9d	2¾	11½	132	**.50**
10d	3	10½	94	**.45**
12d	3¼	10½	88	**.40**
16d	3½	10	71	**.35**
20d	4	9	52	**.25**
30d	4½	9	46	**.25**
40d	5	8	35	**.25**

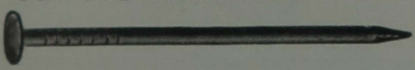
Cement Coated Common Nails

(Coolers)

These flat head common nails are used for crates, boxes, framing, etc. They are specially designed for use in automatic nailing machines, and are well adapted to hand driving in soft wood.

Size	Advance Over Base per 100 Lbs.	Length Inches	Gage No.	Approx. No. in Pound
2d	**$2.40**	1	16	1084
3d	**1.90**	1⅛	15½	848
4d	**1.55**	1⅜	14	488
5d	**1.35**	1⅝	13½	364
6d	**1.15**	1⅞	13	275
7d	**.90**	2⅛	12½	212
8d	**.75**	2⅜	11½	142
9d	**.75**	2⅝	11½	130
10d	**.65**	2⅞	11	104

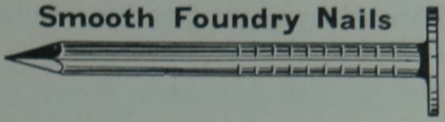
Cement Coated Box Nails



Box nails being of lighter gauge than common or countersunk nails are economical and effective substitutes in those instances where a greater count is preferable to more strength. Especially adapted for use in automatic nailing machines.

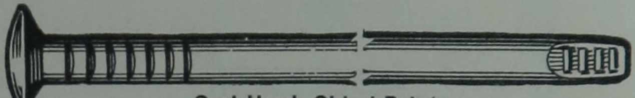
Size	Advance Over Base per 100 Lbs.	Length Inches	Gauge No.	Approx. No. in Pound
2d	**$2.55**	1	16½	1300
3d	**2.05**	1⅛	16	950
4d	**1.90**	1⅜	15½	710
5d	**1.70**	1⅝	15	536
6d	**1.30**	1⅞	13½	306
7d	**1.20**	2⅛	13½	268
8d	**1.00**	2⅜	12½	186
9d	**1.00**	2⅝	12½	167
10d	**.90**	2⅞	11½	118

Smooth Foundry Nails

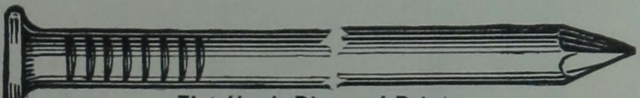


Length Inches	Extra over Base per 100 Pounds			
	8-Gauge	9-Gauge	10-Gauge	11-Gauge
	Size Head, Inches			
	½	½	½	7/16
¾	**$1.35**	**$1.45**	**$1.50**	**$1.55**
⅞	**1.25**	**1.35**	**1.40**	**1.45**
1	**1.15**	**1.25**	**1.30**	**1.35**
1⅛	**1.10**	**1.20**	**1.25**	**1.30**
1¼	**1.05**	**1.15**	**1.20**	**1.25**
1½	**1.00**	**1.10**	**1.15**	**1.20**
1¾	**1.00**	**1.10**	**1.15**	**1.20**
2	**1.20**	**1.25**	**1.35**	**1.45**
2¼	**1.15**	**1.20**	**1.30**	**1.40**
2½	**1.15**	**1.20**	**1.30**	**1.40**
2¾	**1.10**	**1.15**	**1.25**	**1.35**
3 and longer	**1.05**	**1.10**	**1.20**	**1.30**

Spikes



Oval Head, Chisel Point

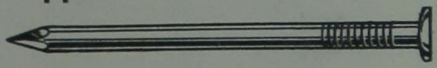


Flat Head, Diamond Point

Made with flat or oval head, diamond or chisel point. Unless otherwise ordered, flat head diamond point will be furnished.

Size	Length Inches	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base
10d	3	6	41	**$.40**
12d	3¼	6	38	**.35**
16d	3½	5	30	**.30**
20d	4	4	23	**.25**
30d	4½	3	17	**.25**
40d	5	2	13	**.25**
50d	5½	1	10	**.25**
60d	6	1	9	**.25**
7-inch	7	5/16-inch	6	**.25**
8 "	8	⅜ "	4	**.35**
9 "	9	⅜ "	3½	**.35**
10 "	10	⅜ "	3	**.45**
12 "	12	⅜ "	2½	**.45**

Copper Wire Common Nails



Packed in 100-pound kegs.

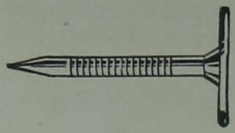
Length Inches	Gauge No.	Approx. No. to Pound	Extra over Base	Length Inches	Gauge No.	Approx. No. to Pound	Extra over Base
⅝	16	1480	**$.07¼**	**2**	11	128	**$.01**
¾	16	1216	**.06½**	**2**	10	114	**.00¾**
¾	15	1030	**.05½**	**2½**	10	84	**.00¾**
⅞	15	750	**.05**	**3**	9	57	**.00½**
1	15	575	**.04¾**	**3½**	8	40	**.00½**
1¼	14	400	**.03¾**	**4**	6	30	Base
1½	12	260	**.01¾**	**4½**	5	15	Base
1¾	12	156	**.01¾**	**5**	4	12	Base
1¾	11	140	**.01**	**6**	2	7	Base

Orders of less than 100 pounds, add 2 cents per pound extra.

Slating Nails

Size....................	**2d**	**2d**	**3d**	**4d**	**5d**	**6d**
Extra Over Base.......	**$1.20**	**1.15**	**1.00**	**.85**	**.75**	**.65**
Length..........inches	1	1	1¼	1½	1¾	2
Gage No............	12	11	10½	10½	10	9
Approx. No. to Pound..	411	352	225	187	142	103

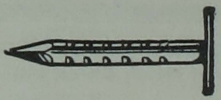
American Felt Roofing Nails



Length Inches	Gauge No.	Diam. Head In.	Count per Lb. Bright	Count per Lb. Galv.	Price, per Lb. Bright	Price, per Lb. Galv.
¾	11	⅝	184	164	....	....
⅞	11	⅝	175	157	....	....
1	11	⅝	162	145	....	....
1⅛	11	⅝	149	133	....	....
1¼	11	⅝	136	122	....	....
¾	12	⅝	210	188	....	....
⅞	12	⅝	195	175	....	....
1	12	⅝	180	162	....	....
1⅛	12	⅝	170	154	....	....
1¼	12	⅝	161	147	....	....

Large Head Barbed Roofing Nails

Diamond Points

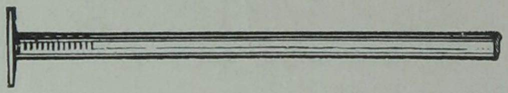


Copper steel, bright or hot galvanized.

Gage No.	Diam. Head In.	Extra Over Base, Per 100 Pounds — Length, Inches ¾	⅞	1	1⅛	1¼	1½	1¾	2
8	½	$1.40	$1.30	$1.20	$1.15	$1.10	$1.05	$1.00	$1.00
9	½	1.50	1.40	1.30	1.25	1.20	1.15	1.10	1.10
9½	½	1.55	1.45	1.35	1.30	1.25	1.20	1.15	1.15
10	7/16	1.55	1.45	1.35	1.30	1.25	1.20	1.15	1.15
10½	7/16	1.65	1.55	1.45	1.40	1.35	1.30	1.25	1.25
10	½	1.65	1.55	1.45	1.40	1.35	1.30	1.25	1.25
11	7/16	1.70	1.60	1.50	1.45	1.40	1.35	1.30	1.30
12	⅜	1.80	1.70	1.60	1.55	1.50	1.45	1.40	1.40

Subject to charge for galvanizing.

Sheet Roofing Fasteners

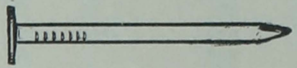


With curved or flat head. Made in following sizes.

Lgth. In.	Diam. In.	Approx. Count per Lb.	Lgth. In.	Gauge No.	Approx. Count per Lb.
6	⅛	46	8	10	30
7	⅛	40	9	10	27
8	⅛	34	10	10	24
9	⅛	31	12	10	20
10	⅛	28	13	10	..
12	⅛	23	14	10	..
14	⅛	20	15	10	..
..	..	..	15½	10	..

Annealed or galvanized. Prices upon application.

Shingle Nails

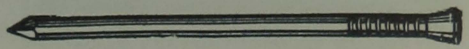


Flat head, diamond point. Made of copper steel, bright or hot galvanized.

3d galvanized common nails are sometimes used for shingling. Be sure to specify which style is wanted.

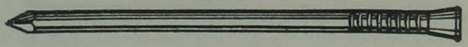
Size No.	Extra Over Base Price Bright Each	Length In.	Gauge No.	Diam. Head In.	Approx. No. to Pound Bright
3d	$1.05	1¼	13	¼	429
3½	.85	1⅜	12½	9/32	345
4d	.80	1½	12	9/32	274
5d	.70	1¾	12	9/32	235
6d	.60	2	12	9/32	204

Flooring Brads



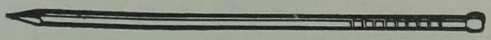
Size	Length Inches	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base
6d	2	11	157	$.65
7d	2¼	11	139	.60
8d	2½	11	120	.60
8d	2½	10	99	.55
9d	2¾	10	90	.50
10d	3	9	69	.45
12d	3¼	8	54	.40
16d	3½	7	43	.35
20d	4	6	31	.30

Casing Nails



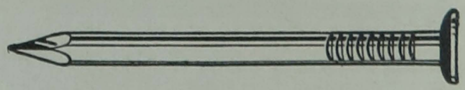
Size	Length Inches	Gauge No.	Approx. No. to Lb	Price, Extr Over Base
2d	1	15½	1010	$1.70
3d	1¼	14½	635	1.20
4d	1½	14	473	1.05
5d	1¾	14	406	.95
6d	2	12½	236	.70
7d	2¼	12½	210	.65
8d	2½	11½	145	.60
9d	2¾	11½	132	.55
10d	3	10½	94	.50
12d	3¼	10½	87	.45
16d	3½	10	71	.40
20d	4	9	52	.30
30d	4½	9	46	.30
40d	5	8	35	.30

Finishing Nails



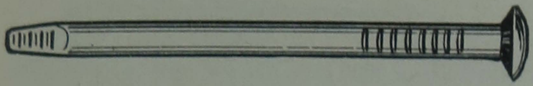
Size	Extra Over Base	Length Inches	Gauge No.	Approx. No. to Lb.
2d	$2.25	1	16½	1351
3d	1.60	1¼	15½	807
4d	1.45	1½	15	584
5d	1.35	1¾	15	500
6d	.80	2	13	309
7d	.75	2¼	13	238
8d	.65	2½	12½	189
8d	.65	2½	12	179
9d	.60	2¾	12½	172
10d	.55	3	11½	121
12d	.50	3¼	11½	113
16d	.45	3½	11	90
20d	.35	4	10	62

Fence Nails



Size	Length Inches	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base
5d	1¾	10	142	$.60
6d	2	10	124	.55
7d	2¼	9	92	.45
8d	2½	9	82	.45
9d	2¾	8	62	.40
10d	3	7	50	.40
12d	3¼	6	40	.35
16d	3½	5	30	.30
20d	4	4	23	.25

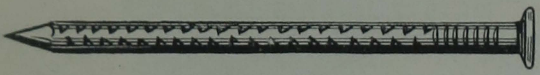
Light Bright Boat Nails



Size	Length and Gauge In.	Length and Gauge No.	Diam. Head In.	Approx. No. to Lb.	Price Extra Over Base
4d	1½	3⁄16	13⁄32	82	$.95
6d	2	3⁄16	13⁄32	62	.80
8d	2½	3⁄16	13⁄32	50	.75
10d	3	¼	½	22	.70
12d	3¼	¼	½	20	.65
16d	3½	¼	½	18	.60
20d	4	¼	½	16	.55

Annealed nails 25 cents per 100 pounds advance.

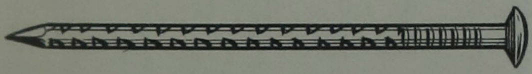
Light Bright Barbed Car Nails



Specify whether oval or flat head.

Size	Lgth. In.	Gauge No.	Approx. No. to Lb.	Price Extra Over Base	Size	Lgth. In.	Gauge No.	Approx. No. to Lb.	Price Extra Over Base
4d	1½	12	274	$1.05	12d	3¼	7	50	$.60
5d	1¾	10	142	.85	16d	3½	7	43	.55
6d	2	10	124	.80	20d	4	6	31	.50
7d	2¼	9	92	.70	30d	4½	6	28	.50
8d	2½	9	82	.70	40d	5	5	21	.50
9d	2¾	8	62	.65	50d	5½	4	17	.50
10d	3	8	57	.65	60d	6	4	15	.50

Heavy Bright Barbed Car Nails

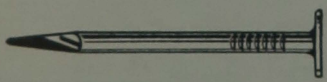


Specify whether oval or flat head.

Size	Lgth. In.	Gauge No.	Approx. No. to Lb.	Price Extra Over Base	Size	Lgth. In.	Gauge No.	Approx. No. to Lb.	Price Extra Over Base
4d	1½	10	165	$.95	12d	3¼	6	42	$.60
5d	1¾	9	118	.80	16d	3½	6	35	.55
6d	2	9	103	.75	20d	4	5	26	.50
7d	2¼	8	76	.70	30d	4½	5	24	.50
8d	2½	8	69	.70	40d	5	4	18	.50
9d	2¾	7	54	.65	50d	5½	3	15	.50
10d	3	7	50	.65	60d	6	3	13	.50

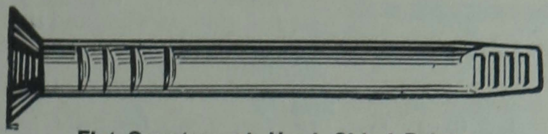
Clout Nails

Flat Head Duck Bill Point

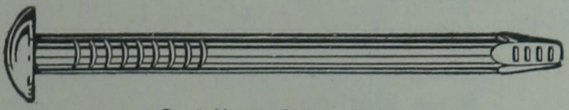


Length Inches	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base Bright	Price, Extra Over Base Annealed
¾	15	1160	$2.40	$2.65
⅞	14	808	1.75	2.00
1	14	705	1.55	1.80
1⅛	14	628	1.50	1.75
1¼	13	423	1.35	1.60
1⅜	13	390	1.25	1.50
1½	13	350	1.20	1.45

Hinge Nails



Flat Countersunk Head, Chisel Point



Oval Head, Chisel Point

In ordering specify whether oval or countersunk head, light or heavy, annealed or bright.

American Steel & Wire Company's steel wire gauge.

Light Hinge Nails—Bright

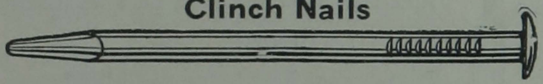
Size	Extra over Base per 100 Lbs.	Length In.	Gauge No.	Degree Csk.	Diam. Head In.	Approx. No. to Pound
4d	$.95	1½	3⁄16	95	13⁄32	82
6d	.80	2	3⁄16	95	13⁄32	62
8d	.75	2½	3⁄16	95	13⁄32	50
10d	.70	3	¼	95	½	25
12d	.65	3¼	¼	95	½	23
16d	.60	3½	¼	95	½	22
20d	.55	4	¼	95	½	19

Heavy Hinge Nails—Bright

Size	Extra over Base per 100 Lbs.	Length In.	Gauge No.	Degree Csk.	Diam. Head In.	Approx. No. to Pound
4d	$.95	1½	No. ¼	95	½	50
6d	.80	2	No. ¼	95	½	38
8d	.75	2½	No. ¼	95	½	30
10d	.80	3	⅜″	95	¾	12
12d	.75	3¼	⅜″	95	¾	11
16d	.70	3½	⅜″	95	¾	10
20d	.65	4	⅜″	95	¾	9

Annealed nails 25 cents per 100 pounds advance.

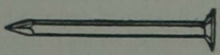
Clinch Nails



Oval head, duck bill point, bright or annealed.
Bright nails will be furnished unless otherwise ordered.

Size	Length In.	Gage No.	Extra Over Base Per 100 Lbs. Bright	Extra Over Base Per 100 Lbs. Annealed	Head Rad. In.	Head Diam.	Approx. No. to Lb.
2d	1	14	$1.55	$1.80	¼	3⁄16″	710
3d	1¼	13	1.35	1.60	¼	7⁄32″	429
4d	1½	12	1.10	1.35	¼	¼″	274
5d	1¾	12	1.00	1.25	¼	¼″	235
6d	2	11	.90	1.15	5⁄16	2 Ga.	157
7d	2¼	11	.85	1.10	5⁄16	2 Ga.	139
8d	2½	10	.80	1.05	5⁄16	9⁄32″	99
9d	2¾	10	.75	1.00	5⁄16	9⁄32″	90
10d	3	9	.70	.95	5⁄16	5⁄16″	69
12d	3¼	9	.65	.90	5⁄16	5⁄16″	62
16d	3½	8	.60	.85	⅜	11⁄32″	49
20d	4	7	.55	.80	⅜	⅜″	37

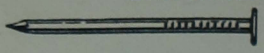
Barrel Nails



Size............in.	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½
Ex. Over Base...	$2.45	2.10	1.45	1.25	1.20	1.15	.95	.90
Length.........in.	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½
Gauge No........	15½	15½	14½	14½	14½	14	13	13
Lb. Approx. No..	1615	1346	906	775	700	568	400	367

We are in position to supply many items not shown in this catalogue and shall be pleased to receive your inquiries.

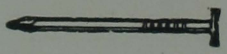
Sterilized Blued Lath Nails



Lathers carry the nails in the mouth while at work and it is therefore necessary to have the nails sterilized.

Size	Lgth. In.	Gauge No.	Approx. No. to Lb.	Price Extra Over Base	Size	Lgth. In.	Gauge No.	Approx. No. to Lb.	Price Extra Over Base
2d	1	16½	1351	$2.55	3d	1⅛	15	778	$1.95
2d Light	1	17	1560	2.75	3d Light	1⅛	16	1015	2.50

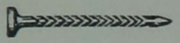
Fine Nails



Size	Length Inches	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base
2d	1	16½	1351	$2.20
3d	1⅛	15	778	1.60
*2d	1	17	1560	2.40
*3d	1⅛	16	1015	2.15

*Extra fine

Barbed Berry Box Nails



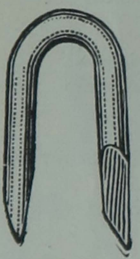
Size In.	Length. In.	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base	Size In.	Length In.	Gauge No.	Approx. No. to Lb.	Price, Extra Over Base
¾	¾	16	1500	$3.05	1⅛	1⅛	16	1010	$2.55
⅞	⅞	16	1300	2.80	1¼	1¼	16	910	2.50
1	1	16	1150	2.60	...	...	..	...	....

For No. 17 gauge, add 20 cents per 100 pounds advance over No. 16 gauge. For smooth, deduct 25 cents per 100 pounds.

12.50 13.60

Wire Fence Staples

Annealed, Polished, or Galvanized



1-Inch

American Steel and Wire Co.'s Steel Wire Gage

Length Inches	Approx. No. to Lb. of No. 9	Length Inches	Approx. No. to Lb. of No. 9
¾	152	1½	72
⅞	120	1¾	65
1	108	2	58
1⅛	96	2¼	47
1¼	87	2½	40

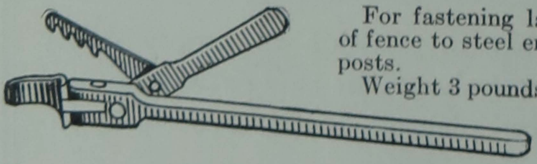
	Extra Over Base
Made of No. 9 Gage Wire.......extra per 100 pounds	Base
*Made of No. 8 Gage Wire or Coarser .... per 100 pounds	$.25
*Made of No. 10 Gage Wire.....extra per 100 pounds	.20
*Made of No. 11 Gage Wire.....extra per 100 pounds	.30
*Made of No. 12 Gage Wire.....extra per 100 pounds	.45
*Made of No. 13 Gage Wire.....extra per 100 pounds	.65
Staples Longer Than 2½ Inches and up to 3 Inches ....extra per 100 pounds	.50
Barbed Staples, All Lengths and Gages ....extra per 100 pounds	.25
Oiling Staples..................extra per 100 pounds	.15

Staples longer than 3 inches cannot be furnished.

Annealed staples same price as polished.

*Subject to quantity extras when shipped in lots less than 1000 pounds of 1 size.

American Perfection Fence End Tools



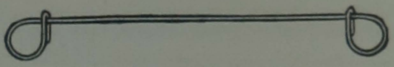
For fastening lateral wires of fence to steel end or corner posts.

Weight 3 pounds.

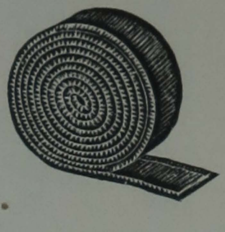
Each.. $2.00

Ty-Tite Wire Ties and Tying Tools

Bar Ties



Put up in coils of 5000 ties. Black wire only. In lots of less than 5000, add 25 cents per 1000.



Lgth. Over All In.	Coils of 5000 Per 1000	Gage	Lgth. Over All In.	Coils of 5000 Per 1000	Gage
3	$1.00	16	7½	$1.40	16
3½	1.00	16	8	1.50	16
4	1.10	16	8½	1.50	16
4½	1.10	16	9	1.70	16
5	1.20	16	9½	1.70	16
5½	1.20	16	10	1.80	16
6	1.30	16	11	1.90	16
6½	1.30	16	12	2.00	16
7	1.40	16	..	....	..

Snow Fence Ties

14-Ga., Black Wire Only, Add per 1000 to Above.....	$.25
13-Ga., Black Wire Only, Add per 1000 to Above....	.50

Bag Ties

Same as bar ties; with smaller loops. Black or coppered wire finish.

Lengths, 3 to 6 inches; 18 and 19 gage. Lengths over 6 inches to 10 inches, add 10 cents per inch.

Per 1000, in Coils of 5000................ .... $.75

Bar Tie Table

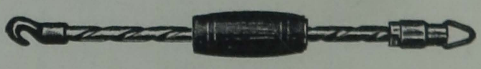
For Various Rod Combinations

Rod Inches		Length Inches of Tie to be Used ¼	⅜	½	⅝	¾	⅞	1	1⅛	1¼
¼	R	3	3½	4	4½	5	6	6	6½	6½
¼	S	3½	4	4½	5½	6	7	7	7½	7½
⅜	R	3½	4	4½	4½	5	6	6½	7	7
⅜	S	4	4½	5½	5½	6	7	7½	8	8
½	R	4	4½	4½	5	5½	6	7	7	7½
½	S	4½	5½	5½	6	6½	7	8	8	8½
⅝	R	4½	4½	5	5½	6	6½	7	7½	7½
⅝	S	5½	5½	6	6½	7	7½	8	8½	8½
¾	R	5	5	5½	6	6	7	7½	7½	8
¾	S	6	6	6½	7	7	8	8½	8½	9
⅞	R	6	6	6	6½	7	7	7½	8	8½
⅞	S	7	7	7	7½	8	8	8½	9	9½
1	R	6	6½	7	7	7½	7½	8	8½	9
1	S	7	7½	8	8	8½	8½	9	9½	10
1⅛	R	6½	7	7	7½	7½	8	8½	9	9½
1⅛	S	7½	8	8	8½	8½	9	9½	10	11
1¼	R	6½	7	7½	7½	8	8½	9	9½	10
1¼	S	7½	8	8½	8½	9	9½	10	11	11

R—round deformed. S—square deformed or twisted.

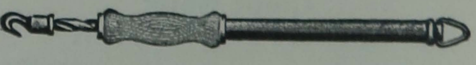
Ty-Tite Spiral Twister

No. 1



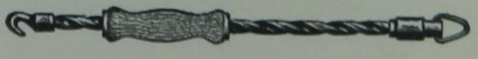
No. 1, Spiral Twister for Heavy Work..........each $2.90

No. 2



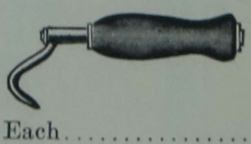
No. 2, Spring Return Twister..................each $4.40

No. 3



No. 3, Spiral Twister for Bag Ties and Light Work ....each $2.90

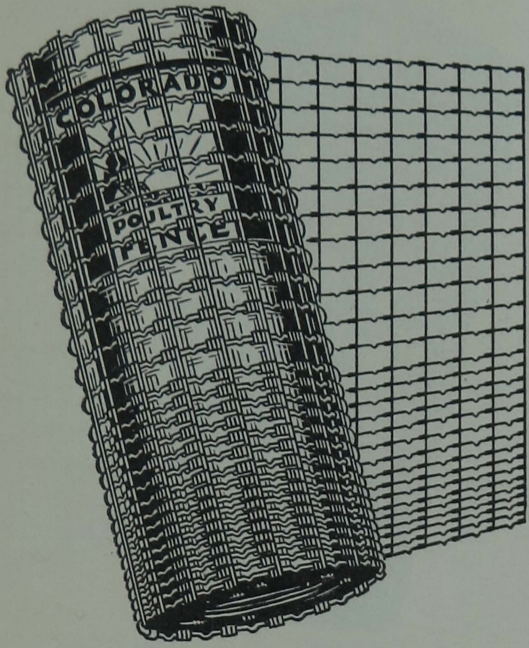
Pistol Grip Twister



Two or three twists with this handy tool and the tie is complete.

Each.. $1.00

Colorado Sunrise Poultry Fence



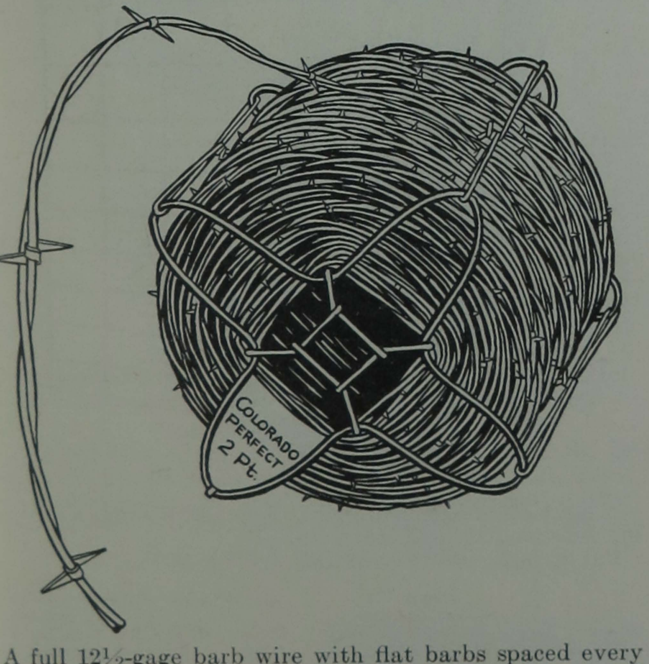
A square mesh pattern general poultry fence, especially adaptable for confining all kinds of large fowl and for excluding rabbits. The fabric, supported by strong top and bottom wires, is easy to erect.

The top and bottom wires are No. 15 gage and the intermediate and stay wires, No. 17 gage. Stay wires are spaced at 4-inch intervals.

Put up in 150-foot rolls.

Design No.	Number of Bars	Height Inches	Approx. Wt. Lbs. Per Roll	Design No.	Number of Bars	Height Inches	Approx. Wt. Lbs. Per Roll
2872	28	72	62.1	**1624**	16	24	32.3
2560	25	60	55.8	**1318**	13	18	25.9
2248	22	48	47.8	**1012**	10	12	20.0
1936	19	36	39.7	....	..	..	....

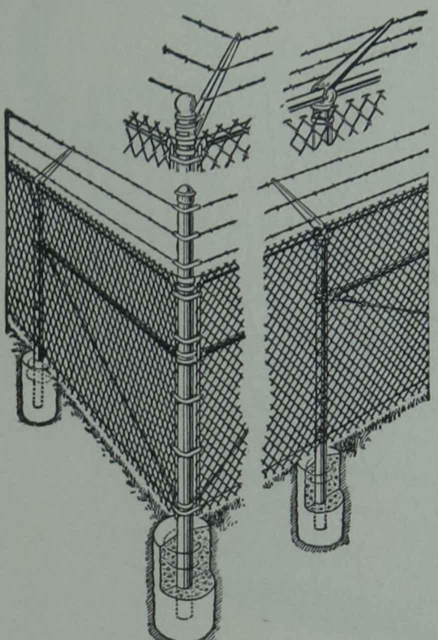
Colorado Perfect 2 Pt. Cattle Barbed Wire



A full 12½-gage barb wire with flat barbs spaced every 5-inches, single wrapped on the strand. Furnished painted or galvanized as specified.

Furnished in 100-pound or 80-rod reels.

Colorado Chain Link Fence



All material used in Colorado Chain Link Fence is made of high quality copper-bearing steel and heat treated malleable cast iron. The chain link fabric is supplied either galvanized before or after weaving, as specified.

Galvanized before, fabric is made of copper-bearing steel wire and is wiped to give the wire a smooth, uniform, heavy coating of virgin zinc. Wire is then woven into chain link fabric.

Galvanized after, fabric is woven of carefully drawn, best quality copper-bearing steel wire, thoroughly cleaned, then galvanized by the hot-dip process, giving a stronger and more durable construction. All posts, top rail and bracing used in the construction of Colorado Chain Link Fence are of standard weight lap or butt welded steel pipe, with or without copper content as specified. All pipe is galvanized by the hot-dip process.

Fittings are either malleable cast iron or pressed steel. Where fittings are formed by a combination of both malleable iron and pressed steel, these fittings are riveted or welded together before galvanizing.

All gate frames are made of standard weight copper-bearing steel pipe. All joints and connections are carefully bolted together with cadmium plated or galvanized bolts.

Lifeguard

For owners who desire two-way protection. Made in heights of 3 to 12-feet of No. 6, 9, or 11-gage wire, 2-inch mesh.

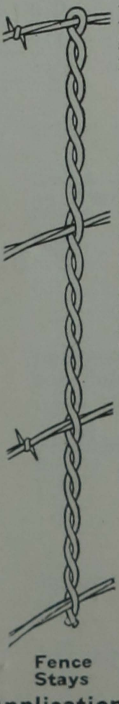
Steelguard

Protection for elimination of hazard of trespass.

Made in heights of 3 to 12-feet of No. 9 or 11-gage copper-bearing steel wire, 2-inch mesh.

Colossal

Used to enclose industrial units where danger lurks. Made in heights of 6 to 12-feet of No. 6, 9, or 11-gage finest copper-bearing steel wire, 2-inch mesh.



Fence Stays

Colorado Cinch Fence Stays

Adds strength, rigidity and functions as an extra vertical stay wire but is stronger. Made of 9½-gage copper bearing steel, heavily galvanized. Easy to apply.

Lgth. In.	Wt. Lbs.	Lgth. In.	Wt. Lbs.	Lgth. In.	Wt. Lbs.	Lgth. In.	Wt. Lbs.
24	225	**34**	325	**44**	425	**54**	525
26	245	**36**	345	**46**	445	**56**	545
28	265	**38**	365	**48**	465	**58**	565
30	285	**40**	385	**50**	485	**60**	585
32	305	**42**	405	**52**	505	..	...

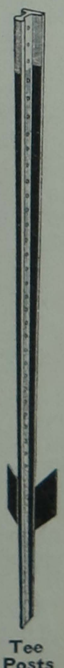
Colorado Silver Tip Tee Posts

A rail section post. Large anchor provides position stability. Painted with complete protective green enamel tipped with silver.

Has met every state test successfully.

Packed five together ready for shipment.

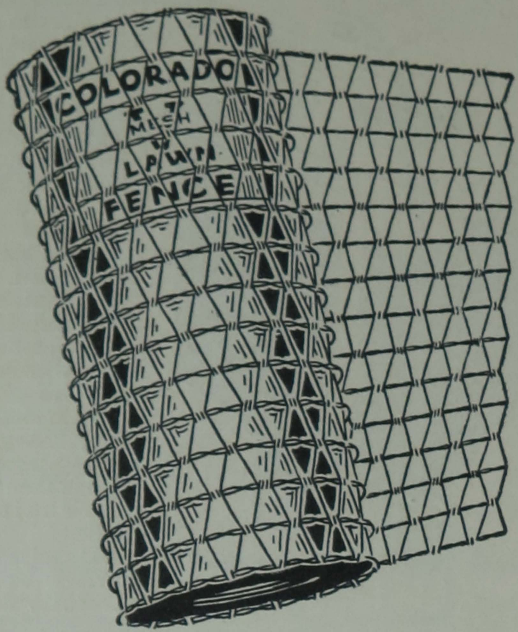
Length Feet	Weight Pounds	Length Feet	Weight Pounds
5	7.32	**7**	9.98
5½	7.99	**7½**	10.65
6	8.65	**8**	11.31
6½	9.32	...	.....



Tee Posts

Prices on Application

Colorado V-Mesh Fence



Strongest construction known in fence building, no cut wires, no knots, cross wires are interwoven with horizontal wire to make complete one piece fabric.

Put up in 10 and 20 rod rolls.

No. F-1, 4x4 Mesh

Horizontal wires No. 12½-gage, cross wires, No. 14-gage.

Height Inches	Approx. Wt., Lbs. Rod	Height Inches	Approx. Wt., Lbs. Rod	Height Inches	Approx. Wt., Lbs. Rod
94	33.6	**58**	21.6	**26**	9.7
84	30.6	**50**	18.7	**18**	6.8
76	27.6	**42**	15.7	..	...
68	24.6	**34**	12.7	..	...

No. I-2, 2x4 Mesh

Horizontal wires are two strand No. 12½-gage twisted cables spaced 4-inches apart and cross wires are No. 14-gage spaced 2-inches apart on the horizontal cables.

Height Inches	Approx. Wt., Lbs. per Rod	Height Inches	Approx. Wt., Lbs. per Rod	Height Inches	Approx. Wt., Lbs. per Rod
94	45.8	**58**	29.4	**26**	13.1
84	41.7	**50**	25.3	**18**	9.0
76	37.6	**42**	21.2	..	....
68	33.5	**34**	17.2	..	....

No. K-4, 2x4 Mesh

Specification is as I-2 except that the horizontal cables are 3-strand of the heavier No. 12½-gage wire.

Height Inches	Approx. Wt., Lbs. per Rod	Height Inches	Approx. Weight, Lbs. per Rod
58	44.6	**34**	26.0
50	38.4	**26**	19.8
42	32.2	**18**	13.6

No. M-5, 2x4 Mesh

The horizontal wires are No. 14-gage with the exception of the seventh and eleventh from the bottom which are 2-strand twisted cables. Cross wires are No. 16-gage wire.

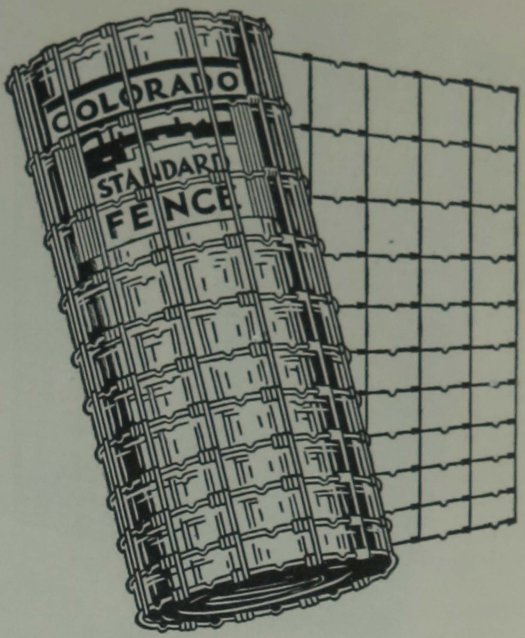
Height Inches	Approx. Weight, Lbs. per Rod	Height Inches	Approx. Weight, Lbs. per Rod
58	14.9	**42**	10.7
50	13.0	..	....

No. L-6, 2x4 Mesh

Horizontal wires are No. 14-gage single wires except bottom and top, which are 2-strand twisted cables. Cross wires are No. 16-gage.

Made in 26-inch height only. Approximate weight per rod 6.6 pounds.

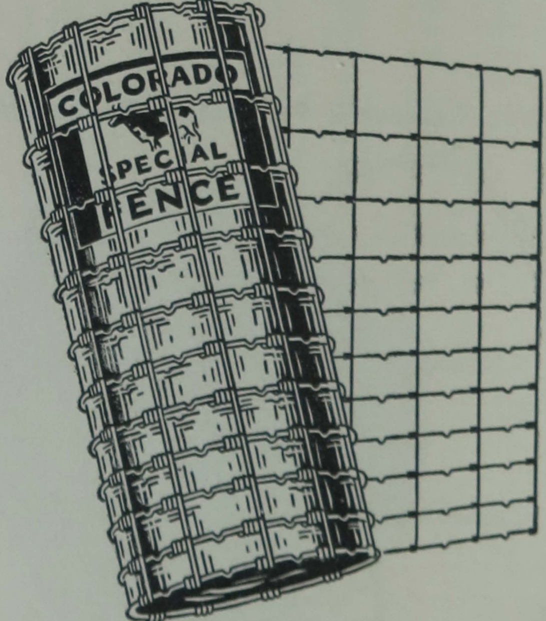
Colorado Standard Fence



A general purpose stock and field fence of exceptional strength. Top and bottom wires No. 9. Intermediate and stays No. 11. Put up in 20 and 40 rod rolls.

Design No.	Height In.	Approx. Wt. Lbs. per Rod Stay Wires 6-In. Apart	Approx. Wt. Lbs. per Rod Stay Wires 12-In. Apart	Design No.	Height In.	Approx. Wt. Lbs. per Rod Stay Wires 6-In. Apart	Approx. Wt. Lbs. per Rod Stay Wires 12-In. Apart
726	26	9.2	7.2	**845**	45	....	9.0
832	32	10.7	8.3	**949**	49	....	9.9
635	35	....	7.0	**1047**	47	14.0	10.6
939	39	12.3	9.4	**1155**	55	15.8	11.8

Colorado Special Fence



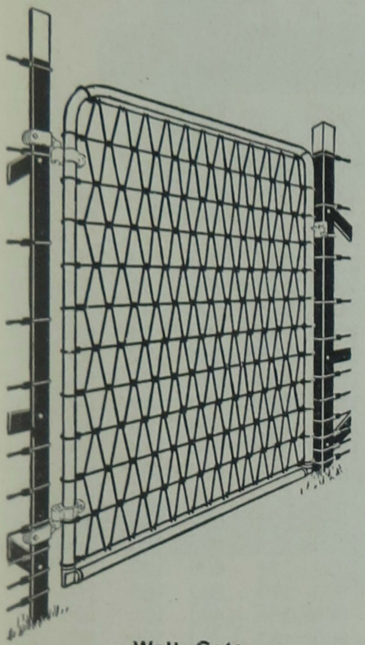
A light stock and field fence. Top and bottom wires No. 10. Intermediate and stays No. 12½.

Put up in 20 and 40 rod rolls.

Design No.	Height In.	Approx. Wt. Lbs. per Rod Stay Wires 6-In. Apart	Approx. Wt. Lbs. per Rod Stay Wires 12-In. Apart	Design No.	Height In.	Approx. Wt. Lbs. per Rod Stay Wires 6-In. Apart	Approx. Wt. Lbs. per Rod Stay Wires 12-In. Apart
726-S	26	6.4	5.1	**845-S**	45	...	6.3
832-S	32	7.4	5.8	**949-S**	49	...	6.9
635-S	35	...	5.0	**1047-S**	47	9.5	7.3
939-S	39	8.4	6.6	**1155-S**	55	10.8	8.2

Prices on Application

Colorado Farm Gates



Walk Gate

Single drive and walk gate. Ruggedly constructed of 1-inch tubular frame. A V-mesh filler of No. 10 gage line wire spaced 4-inches and No. 12½ cross wire spaced 2 inches. Single drive is 1⅜-inch O. D. frame and walk gate is 1⅛-inch O. D. frame.

Prohibits small animals passing thru and prevents children a foothold to swing on gates.

Furnished galvanized or dark green.

Walk Gates

Width of Opening Feet	Approx. Height of Gate In.	Approx. Weight Pounds
3	42	19
3	50	21
3	58	23
3½	42	21
3½	50	23
3½	58	25
4	42	22
4	50	24
4	58	27

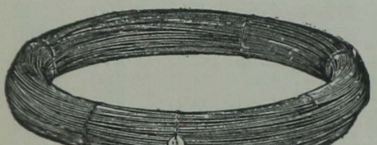
Single Drive Gates

Width of Opening Feet	Approx. Height of Gate In.	Approx. Weight Lbs.	Width of Opening Feet	Approx. Height of Gate In.	Approx. Weight Lbs.	Width of Opening Feet	Approx. Height of Gate In.	Approx. Weight Lbs.
8	42	53	10	50	61	12	58	77
8	50	57	10	58	67	14	42	73
8	58	63	12	42	65	14	50	80
10	42	56	12	50	71	14	58	87

Prices on Application

Annealed and Galvanized Wire

American Steel and Wire Company's Steel Wire Gauge



Size No.	Extra for Size Over Base Price Per 100 Pounds Annealed Wire	Extra for Size Over Base Price Per 100 Pounds Galvanized Wire	Size No.	Extra for Size Over Base Price Per 100 Pounds Annealed Wire	Extra for Size Over Base Price Per 100 Pounds Galvanized Wire
0–5	Base	$.25	14	$.35	$.55
6–9	Base	Base	15	.60	.85
10	$.05	$.05	16	.80	1.05
11	.10	.10	17	1.10	1.40
12–12½	.15	.20	18	1.60	1.90
13	.25	.35	..	....	....

Even weight bundles 5 cents per bundle extra, except standard 100-pound bundles which take no extra charge.

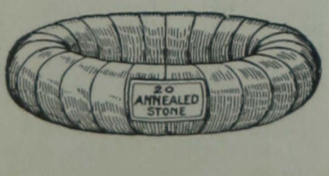
Galvanized Brace Wire

Furnished Nos. 8 and 9 gauge wire, in 5-pound coils, 20 coils to the bundle of 100 pounds. Sold in 100-pound quantities or multiples, at $1.00 per 100 pounds advance over base of No. 8 galvanized fence wire shown above.

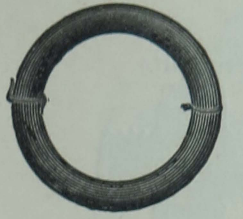
Annealed Stone Wire

Twelve pounds in a stone or bundle.

No.	Per Pound	No.	Per Pound
16	.....	20	.....
17	.....	21	.....
18	.....	22	.....
19	.....	23	.....



Stove Pipe Wire



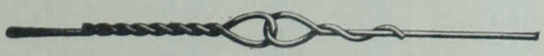
In 50-foot coils. Packed one dozen coils in a box and 20 boxes in a case.

Furnished lacquered, annealed, rust-proof enameled, galvanized and coppered in 18, 19 and 20 W & M gauge.

Prices upon application.

Hay Bale Ties

Single Loop—Black



Per Bundle of 250 Ties

Length Feet	Size Steel Wire Gauge No. 16½ Wt. Lbs.	No. 16 Wt. Lbs.	No. 15 Wt. Lbs.	No. 14 Wt. Lbs.
7½	....	....	27.1	....
8½	20.0	....	....	....
9	21.1	24.3	32.3	39.8
9½	....	25.6	34.0	42.0
12	....	....	42.6	....

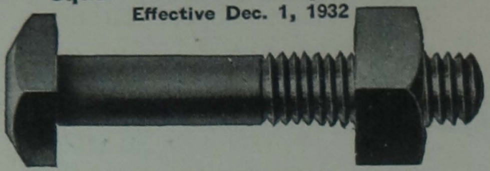
Weights shown are approximate only.

Wire Gauge Standards

No. of Wire Gauge	American or Brown & Sharpe for Non-Ferrous Metals	Birmingham, or Stubs' Iron Wire	American S. & W. Co's. (Washburn & Moen) Std. Steel Wire	American S. & W. Co's. Music Wire	Imperial Wire	Stubs Steel Wire	U. S. Standard Gauge for Sheet and Plate Iron & Steel
0000000	.651354	....	.4900	....	.500	....	.500
000000	.580049	....	.4615	.004	.464	....	.46875
00000	.516549	.500	.4305	.005	.432	....	.4375
0000	.460	.454	.3938	.006	.400	....	.40625
000	.40964	.425	3625	.007	.372	....	.375
00	.3648	.380	.3310	.008	.348	....	.34375
0	.32486	.340	.3065	.009	.324	....	.3125
1	.2893	.300	.2830	.010	.300	.227	.28125
2	.25763	.284	.2625	.011	.276	.219	.265625
3	.22942	.259	.2437	.012	.252	.212	.250
4	.20431	.238	.2253	.013	.232	.207	.234375
5	.18194	.220	.2070	.014	.212	.204	.21875
6	.16202	.203	.1920	.016	.192	.201	.203125
7	.14428	.180	.1770	.018	.176	.199	.1875
8	.12849	.165	.1620	.020	.160	.197	.171875
9	.11443	.148	.1483	.022	.144	.194	.15625
10	.10189	.134	.1350	.024	.128	.191	.140625
11	.090742	.120	.1205	.026	.116	.188	.125
12	.080808	.109	.1055	.029	.104	.185	.109375
13	.071961	.095	.0915	.031	.092	.182	.09375
14	.064084	.083	.0800	.033	.080	.180	.078125
15	.057068	.072	.0720	.035	.072	.178	.0703125
16	.05082	.065	.0625	.037	.064	.175	.0625
17	.045257	.058	.0540	.039	.056	.172	.05625
18	.040303	.049	.0475	.041	.048	.168	.050
19	.03589	.042	.0410	.043	.040	.164	.04375
20	.031961	.035	.0348	.045	.036	.161	.0375
21	.028462	.032	.0317	.047	.032	.157	.034375
22	.025347	.028	.0286	.049	.028	.155	.03125
23	.022571	.025	.0258	.051	.024	.153	.028125
24	.0201	.022	.0230	.055	.022	.151	.025
25	.0179	.020	.0204	.059	.020	.148	.021875
26	.01594	.018	.0181	.063	.018	.146	.01875
27	.014195	.016	.0173	.067	.0164	.143	.0171875
28	.012641	.014	.0162	.071	.0149	.139	.015625
29	.011257	.013	.0150	.075	.0136	.134	.0140625
30	.010025	.012	.0140	.080	.0124	.127	.0125
31	.008928	.010	.0132	.085	.0116	.120	.0109375
32	.00795	.009	.0128	.090	.0108	.115	.01015625
33	.00708	.008	.0118	.095	.0100	.112	.009375
34	.006304	.007	.0104	....	.0092	.110	.00859375
35	.005614	.005	.0095	....	.0084	.108	.0078125
36	.005	.004	.0090	....	.0076	.106	.00703125
37	.004453	....	.0085	....	.0068	.103	.00664063
38	.003965	....	.0080	....	.0060	.101	.00625
39	.003531	....	.0075	....	.0052	.099	....
40	.003144	....	.0070	....	.0048	.097	....

Machine Bolts
American Standard Regular Square Heads and Square Nuts

Effective Dec. 1, 1932



Cut Thread—Per 100

Length Inches	Diameter, Inches					
	3/16 and ¼	5/16	⅜	7/16	½	9/16 and ⅝
¾	$1.10	$1.70	$2.25	.....	.....	.....
1	1.15	1.75	2.35	$3.95	$4.60	$8.10
1¼	1.25	1.80	2.45	4.10	4.80	8.35
1½	1.30	1.95	2.60	4.25	5.00	8.60
2	1.50	2.20	2.90	4.55	5.35	9.10
2½	1.70	2.45	3.20	4.85	5.75	9.60
3	1.85	2.70	3.50	5.20	6.15	10.10
3½	2.05	2.95	3.80	5.50	6.50	10.60
4	2.50	3.15	4.10	5.85	6.85	11.10
4½	2.65	3.60	4.40	6.15	7.25	11.60
5	2.80	3.80	4.80	6.50	7.65	12.10
5½	2.95	4.00	5.10	6.85	8.05	12.60
6	3.10	4.20	5.40	7.15	8.45	13.10
6½	3.80	5.10	6.50	9.20	10.15	13.60
7	4.00	5.35	6.85	9.65	10.60	14.10
7½	4.15	5.55	7.15	10.10	11.05	14.60
8	4.35	5.80	7.50	10.55	11.50	15.10
8½	4.50	6.00	7.80	11.00	11.95	15.60
9	4.70	6.25	8.15	11.45	12.40	16.10
9½	4.85	6.45	8.45	11.95	12.85	16.60
10	5.05	6.70	8.80	12.35	13.30	17.10
11	5.40	7.15	9.50	13.20	14.70	18.10
12	5.75	7.60	10.20	14.05	15.60	19.10
13	6.30	8.25	11.30	15.35	16.50	20.10
14	6.60	8.70	11.95	16.20	17.40	21.10
15	6.95	9.15	12.60	17.15	18.30	22.10
16	7.25	9.60	13.25	18.05	19.20	23.10
17	7.60	10.05	13.90	18.95	20.10	24.10
18	7.90	10.50	14.55	19.85	21.00	25.10
19	8.25	10.95	15.20	20.75	21.90	26.10
20	8.60	11.40	15.85	21.65	22.80	27.10
21					23.70	28.10
22					24.60	29.10
23					25.50	30.10
24					26.40	31.10
25					27.30	32.10

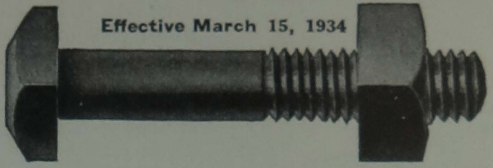
Standard Package Quantity.—¼″ to 6″ long. inc., 100; 5/16″ to 7″ long. inc., 50; ⅜″ to12″ long. inc., 50; 7/16″ to 10″ long. inc., 50; ½″ to 10″ long. inc., 50; ½″, 10½″ to 12″ long. inc., 25; 9/16″ and ⅝″ to 8″ long. inc., 25.

Length Inches	Diameter, Inches				
	¾	⅞	1	1⅛	1¼
1½	$10.95	$16.70	$23.25	......	......
2	11.60	17.60	24.40	......	......
2½	12.25	18.50	25.55	......	......
3	12.90	19.40	26.70	$45.90	$54.45
3½	13.55	20.30	27.85	47.20	56.10
4	14.20	21.20	29.00	48.50	57.75
4½	14.85	22.10	30.15	49.80	59.40
5	15.50	23.00	31.30	51.10	61.05
5½	16.15	23.90	32.45	52.40	62.70
6	16.80	24.80	33.60	53.70	64.35
6½	17.45	25.70	34.75	55.00	66.00
7	18.10	26.60	35.90	56.30	67.65
7½	18.75	27.50	37.05	57.60	69.30
8	19.40	28.40	38.20	58.90	70.95
8½	20.05	29.30	39.35	60.20	72.60
9	20.70	30.20	40.50	61.50	74.25
9½	21.35	31.10	41.65	62.80	75.90
10	22.00	32.00	42.80	64.10	77.55
11	23.30	33.80	45.10	66.70	80.85
12	24.60	35.60	47.40	69.30	84.15
13	25.90	37.40	49.70	71.90	87.45
14	27.20	39.20	52.00	74.50	90.75
15	28.50	41.00	54.30	77.10	94.05
16	29.80	42.80	56.60	79.70	97.35
17	31.10	44.60	58.90	82.30	100.65
18	32.40	46.40	61.20	84.90	103.95
19	33.70	48.20	63.50	87.50	107.25
20	35.00	50.00	65.80	90.10	110.55
21	36.30	51.80	68.10	92.70	113.85
22	37.60	53.60	70.40	95.30	117.15
23	38.90	55.40	72.70	97.90	120.45
24	40.20	57.20	75.00	100.50	123.75
25	41.50	59.00	77.30	103.10	127.05
26	42.80	60.80	79.60	105.70	130.35
27	44.10	62.60	81.90	108.30	133.65
28	45.40	64.40	84.20	110.90	136.95
29	46.70	66.20	86.50	113.50	140.25
30	48.00	68.00	88.80	116.10	143.55

Intermediate lengths take next higher list. Threads cut to American Standard, Coarse (U.S.S.) Thread Series, Class 2. Bolts longer or larger than listed, prices upon application.

Standard Packing of Machine Bolts

Effective March 15, 1934



Length Inches	Diameter									
	¼-Inch		5/16-Inch		⅜-Inch		7/16-Inch		½-Inch	
	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.
¾	4000	103	2500	122	2000	145	....	...	....	...
1	3200	92	3000	162	2800	221	1000	119	1200	201
1¼	3200	103	2000	117	2000	175	700	91	1200	216
1½	3400	119	2100	133	2400	226	1000	137	1200	233
1¾	2600	100	1600	111	1500	154	600	90	800	168
2	3000	124	2000	149	2000	218	1000	157	1000	221
2¼	2200	97	1500	111	1100	130	600	101	600	144
2½	2700	130	2400	199	1800	222	900	159	1000	248
2¾	2000	103	1200	107	1100	146	500	95	500	133
3	2400	129	2400	221	1500	208	900	176	800	221
3¼	1600	93	1000	100	800	118	500	105	500	147
3½	2000	123	1800	186	1200	185	800	173	800	242
3¾	1400	91	900	98	600	98	500	116	300	98
4	2000	135	1400	159	1200	202	800	190	600	199
4½	1600	119	1300	162	1000	184	600	155	600	215
5	1300	106	1000	136	900	179	600	166	600	230
5½	1200	106	800	117	600	130	400	121	500	207
6	1100	104	900	139	800	183	500	160	600	262
6½	1000	102	600	101	500	124	400	137	400	188
7	1000	108	800	140	600	156	400	145	400	198
7½	800	93	500	93	400	112	300	116	250	134
8	1000	120	600	118	600	173	300	122	350	191
8½	....	...	500	103	400	123	300	128	200	119
9	....	...	500	108	500	160	300	133	300	182
9½	....	...	400	91	300	101	200	96	200	129
10	....	...	500	120	500	163	200	100	300	202
10½	....	...	....	...	300	111	200	104	200	144
11	....	...	....	...	300	115	200	107	200	150
11½	....	...	....	...	250	101	200	111	200	155
12	....	...	....	...	300	124	200	115	200	160

Length Inches	Diameter							
	⅝-Inch		¾-Inch		⅞-Inch		1-Inch	
	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.	Quantity	*Wt. Lbs.
1	850	260	600	286	...	...	...	...
1¼	800	261	500	255	...	...	...	...
1½	800	297	475	247	300	252	225	284
1¾	700	259	450	257	300	260	200	255
2	600	235	425	257	275	254	200	270
2¼	600	247	400	254	250	239	180	249
2½	600	259	375	250	225	229	180	260
2¾	500	228	350	255	210	219	170	253
3	500	238	325	237	200	224	150	238
3¼	450	224	300	229	190	215	140	226
3½	400	208	275	222	190	222	135	230
3¾	400	216	275	227	150	184	130	224
4	400	198	275	236	150	190	125	226
4½	300	182	225	208	150	206	110	210
5	300	199	200	201	150	218	110	224
5½	275	188	200	210	130	197	100	215
6	250	184	175	198	130	208	100	226
6½	250	194	175	205	130	218	80	191
7	225	184	150	190	110	195	80	197
7½	225	194	150	200	100	186	80	204
8	200	179	125	171	100	194	80	214
8½	200	189	125	180	100	205	75	207
9	175	174	125	187	100	213	75	219
9½	175	180	125	193	90	175	60	181
10	150	161	125	201	90	209	60	188
10½	150	168	100	168	80	192	50	163
11	150	174	100	175	75	186	50	171
11½	125	152	100	181	75	192	50	178
12	125	157	100	186	75	197	50	182
13	125	168	100	202	75	209	50	193
14	100	143	100	214	50	153	50	203
15	100	155	100	225	50	161	50	213
16	100	163	100	237	50	169	50	224
17	100	171	100	248	50	177	50	234
18	100	180	100	264	50	186	50	246
19	100	188	100	276	50	194	50	257
20	100	196	100	288	50	202	50	267

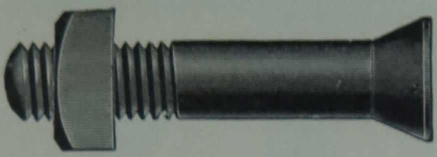
*Gross weights based on cut thread bolts.

Rolled thread up to ⅜x6″ weigh approximately 10% less.

Intermediate lengths same quantities as next larger.

Countersunk Head Machine Bolts

With Square Nut

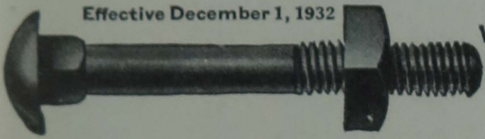


Add, per 100 Extra — Diameter, Inches										
3/16, ¼	5/16	⅜	7/16	½	9/16, ⅝	¾	⅞	1	1⅛	1¼
$.35	.50	.70	1.00	1.50	2.25	3.25	5.00	7.50	12.50	17.50

Popular sizes carried in stock.

Carriage Bolts

Effective December 1, 1932



With American Standard Regular Square Nuts

Cut Thread—Per 100

Length Inches	Diameter, Inches: 3/16 and ¼	5/16	⅜	7/16	½	9/16 and ⅝	¾
¾	$1.05	$1.60	$2.00	.....	.....	.....	.....
1	1.10	1.65	2.10	$3.50	$4.25	.....	.....
1¼	1.15	1.70	2.20	3.60	4.40	$8.35	.....
1½	1.20	1.80	2.35	3.75	4.60	8.60	$12.45
2	1.35	2.00	2.60	4.05	4.95	9.10	13.10
2½	1.55	2.25	2.90	4.40	5.35	9.60	13.75
3	1.70	2.50	3.20	4.75	5.75	10.10	14.40
3½	1.85	2.75	3.50	5.10	6.15	10.60	15.05
4	2.30	2.95	3.80	5.40	6.55	11.10	15.70
4½	2.45	3.40	4.10	5.75	6.95	11.60	16.35
5	2.60	3.60	4.50	6.10	7.35	12.10	17.00
5½	2.75	3.85	4.80	6.45	7.80	12.60	17.65
6	2.90	4.05	5.10	6.80	8.20	13.10	18.30
6½	3.65	4.90	6.30	8.25	9.75	13.60	18.95
7	3.85	5.15	6.65	8.70	10.20	14.10	19.60
7½	4.00	5.35	6.95	9.15	10.65	14.60	20.25
8	4.20	5.60	7.30	9.60	11.10	15.10	20.90
8½	4.35	5.80	7.60	10.05	12.05	15.60	21.50
9	4.55	6.05	7.95	10.50	12.50	16.10	22.20
9½	4.70	6.25	8.25	10.95	12.95	16.60	22.85
10	4.90	6.50	8.60	11.40	13.40	17.10	23.50
11	5.25	6.95	9.30	12.25	14.30	18.10	24.80
12	5.60	7.40	10.00	13.10	15.20	19.10	26.10
13	6.15	8.05	11.10	14.40	16.10	20.10	27.40
14	6.45	8.50	11.75	15.25	17.00	21.10	28.70
15	6.80	8.95	12.40	16.20	17.90	22.10	30.00
16	7.10	9.40	13.05	17.10	18.80	23.10	31.30
17	7.45	9.85	13.70	18.00	19.70	24.10	32.60
18	7.75	10.30	14.35	18.90	20.60	25.10	33.90
19	8.10	10.75	15.00	19.80	21.50	26.10	35.20
20	8.45	11.20	15.65	20.70	22.40	27.10	36.50

Intermediate lengths take next higher list.

Number of Bolts per Package or Carton:—3/16 and ¼ inch diameters, to 8 inches long inc., 100; 5/16 inch diameter, to 10 inches long inc., 50; ⅜ and 7/16 inch diameters, to 12 inches long inc., 50 ½ inch diameter, to 8 inches long inc., 50; ½ inch diameter, 8½ to 12 inches inc., 25; ⅝ inch diameter, to 8 inches long inc., 25

Special Bolts

We are equipped to make bolts of any desired diameters and lengths with any type head and end.

Send us your inquiries.

Standard Packing of Carriage Bolts

Effective March 15, 1934

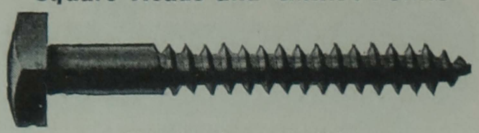
Length Inches	Diameter: 3/16-Inch Quantity	3/16-Inch *Wt. Lbs.	¼-Inch Quantity	¼-Inch *Wt. Lbs.	5/16-Inch Quantity	5/16-Inch *Wt. Lbs.	⅜-Inch Quantity	⅜-Inch *Wt. Lbs.
1	....	...	3000	87	2300	117	1700	129
1¼	....	...	3400	108	2100	119	1500	127
1½	....	...	4200	152	3000	183	2400	223
1¾	....	...	2800	110	2000	136	1500	151
2	....	...	4500	189	2700	191	2000	217
2¼	....	...	2400	103	2000	153	1500	172
2½	....	...	5000	242	2800	231	2100	256
2¾	....	...	2000	101	1600	138	900	118
3	....	...	3600	197	2400	225	2000	272
3¼	....	...	1800	108	1000	99	1000	145
3½	....	...	2400	148	2000	208	1800	271
3¾	....	...	1400	88	1000	110	900	144
4	....	...	2200	149	1800	205	1600	267
4¼	....	...	1800	127	1000	120	800	139
4½	....	...	2000	148	1600	200	1200	216
4¾	....	...	1600	123	1000	130	800	152
5	....	...	1600	129	1200	161	1200	234
5½	....	...	1200	104	900	129	900	190
6	....	...	1100	103	900	142	1000	227
6½	....	...	1000	102	600	99	700	170
7	....	...	1000	105	800	140	800	205
7½	....	...	800	91	500	94	500	136
8	....	...	1000	120	700	134	700	200
8½	....	...	....	...	500	107	400	122
9	....	...	....	...	500	112	500	158
9½	....	...	....	...	400	95	300	102
10	....	...	....	...	500	120	600	208
10½	....	...	....	...	...	...	300	111
11	....	...	....	...	...	...	300	115
11½	....	...	....	...	...	...	250	101
12	....	...	....	...	....	...	250	105

Length Inches	Diameter: 7/16-Inch Quantity	7/16-Inch Wt. Lbs.	½-Inch Quantity	½-Inch Wt. Lbs.	⅝-Inch Quantity	⅝-Inch Wt. Lbs.	¾-Inch Quantity	¾-Inch Wt. Lbs.
1	900	97	800	127	850	235	600	232
1¼	700	84	600	105	800	239	500	225
1½	900	115	1000	185	800	255	450	245
1¾	600	85	600	120	700	226	425	247
2	1000	147	1000	214	600	217	400	246
2¼	600	95	700	156	600	229	375	243
2½	1000	166	1000	236	550	221	350	237
2¾	600	106	600	150	500	212	325	231
3	900	167	1000	263	450	201	300	223
3¼	450	90	400	114	450	220	275	214
3½	800	164	900	262	400	196	275	222
3¾	600	130	400	124	400	204	250	211
4	800	179	800	254	400	212	250	218
4¼	500	118	600	195	300	168	250	224
4½	600	147	600	209	300	173	225	194
4¾	500	127	400	143	300	179	200	180
5	600	159	600	224	300	185	200	201
5½	450	129	500	201	300	197	200	198
6	500	153	600	256	250	176	175	198
6½	400	130	400	184	250	186	150	181
7	400	139	500	242	225	187	150	190
7½	300	111	400	206	200	167	150	200
8	300	117	400	216	200	175	125	177
8½	200	83	400	229	175	161	125	182
9	300	128	300	180	150	146	125	190
9½	200	92	250	159	150	151	100	160
10	200	96	350	229	150	157	100	158
10½	200	99	200	139	125	138	75	125
11	200	103	200	144	100	116	75	130
11½	200	107	200	150	100	120	75	135
12	200	111	200	155	100	124	75	139
13	...	...	200	170	100	132	75	147
14	...	...	200	180	100	140	75	157
15	...	...	200	190	100	155	75	166
16	...	...	200	201	100	163	75	176
17	...	...	200	211	100	171	75	185
18	...	...	200	222	100	180	75	194
19	...	...	200	233	100	188	75	203
20	...	...	200	243	100	196	75	211

*Gross weights based on cut thread bolts.
Rolled thread up to ⅜x6" weigh approximately 10% less.
Intermediate lengths same quantities as next longer.

Lag Bolts

American Standard Regular Square Heads and Gimlet Points



Effective Aug. 11, 1931
Per 100

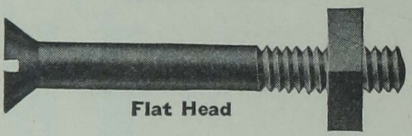
Lgth. In.	Diameter, Inches 1/4 and 5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
1	$2.35	$2.85	$4.25	$5.25	.....	.....	.....	.....
1½	2.15	2.60	3.90	4.85	$7.95	$12.50	.....	.....
2	2.35	2.85	3.55	4.45	7.40	11.75	$18.60	$28.40
2½	2.55	3.10	3.90	4.85	6.85	11.00	17.60	27.10
3	2.80	3.40	4.30	5.30	7.50	11.90	16.80	26.05
3½	3.05	3.70	4.70	5.75	8.15	12.80	18.00	25.00
4	3.30	4.00	5.10	6.20	8.80	13.70	19.20	26.55
4½	3.55	4.30	5.50	6.65	9.45	14.60	20.40	28.10
5	3.80	4.65	5.90	7.10	10.10	15.50	21.60	29.65
5½	4.05	5.00	6.30	7.55	10.75	16.40	22.80	31.20
6	4.35	5.35	6.70	8.00	11.40	17.30	24.00	32.75
6½	4.65	5.70	7.10	8.45	12.05	18.20	25.20	34.30
7	4.95	6.05	7.50	8.90	12.70	19.10	26.40	35.85
7½	5.25	6.40	7.90	9.35	13.35	20.00	27.60	37.40
8	5.55	6.75	8.30	9.80	14.00	20.90	28.80	38.95
9	6.15	7.45	9.10	10.70	15.20	22.65	31.00	41.80
10	6.75	8.15	9.90	11.60	16.40	24.40	33.20	44.65
11	....	8.90	10.80	12.60	17.70	26.25	35.50	47.65
12	....	9.65	11.70	13.60	19.00	28.10	37.90	50.75
13					20.30	29.95	40.50	54.25
14					21.60	31.85	43.10	57.75
15					22.90	33.75	45.75	61.35
16					24.20	35.65	48.40	64.95

Standard Package Quantity.—1/4" up to 4" 100; 5/16" up to 6", 100; 3/8" and 7/16" up to 8", 50; 1/2" up to 12", 50; 5/8" up to 8", 25.

Intermediate lengths take next higher list.

	1/4 and 5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Add for Skein Bolts, per 100								
....	$.50	$.70	$1.00	$1.50	$2.25	$3.25	$5.00	$7.00
Add for Amer. Standard Hexagon Head, per 100								
....	$.20	$.30	$.45	$.65	$1.00	$1.40	$2.20	$3.00
Add for U.S. Standard Hexagon Head, per 100								
....	$.40	$.60	$.90	$1.30	$2.00	$2.50	$3.50	$5.00

Stove Bolts



Flat Head

Round Head

List of May 1, 1934—Price, per 100

Length Inches	Diameter, Inches 5/32	3/16	1/4	5/16	3/8	1/2
3/8	$.57	$.67	.....	.....	.....	.....
1/2	.60	.70	$1.12	.....	.....	.....
5/8	.63	.73	1.18	.....	.....	.....
3/4	.66	.76	1.25	$2.12	$2.90	.....
7/8	.68	.79	1.31	2.20	3.00	.....
1	.71	.83	1.38	2.27	3.10	$8.80
1⅛	.76	.86	1.44	2.34	3.20	9.00
1¼	.80	.90	1.51	2.41	3.30	9.20
1⅜	.84	.96	1.57	2.50	3.40	9.40
1½	.89	1.01	1.64	2.59	3.50	9.60
1¾	1.00	1.12	1.80	2.77	3.75	10.00
2	1.11	1.27	1.98	3.00	4.00	10.50
2¼	....	1.41	2.16	3.20	4.25	11.10
2½	....	1.59	2.34	3.45	4.55	11.70
2¾	....	1.77	2.55	3.70	4.80	12.30
3	....	1.95	2.75	3.95	5.20	13.00
3½	....	2.25	3.10	4.40	5.80	14.40
4	....	2.55	3.45	4.85	6.40	15.80
4½	....	2.85	3.80	5.30	7.00	.....
5	....	3.15	4.15	5.75	7.60	.....
5½	....	3.45	4.50	6.20	....	.....
6	....	3.75	4.85	6.65	....	.....
Deduct for Bolts Less Nuts.....	.10	.12	.20	.35	.50	.80
Add for Hex. Nuts	.05	.07	.10	.20	.30	.50

Lag Bolts

With American Standard Regular Square Heads and Gimlet Points

Length Inches	Diameter 1/4-inch Case Contains	Case Wt. Lbs.	5/16-inch Case Contains	Case Wt. Lbs.	7/16-inch Case Contains	Case Wt. Lbs.
1	5200	107	4600	101	2100	101
1½	3800	87	4200	155	2200	132
2	3600	100	2500	116	3000	212
2½	3600	120	3000	165	2100	175
3	3300	129	2200	143	2100	206
3½	2600	115	1600	117	1500	171
4	2400	122	1200	100	1600	200
4½	2400	137	1200	103	1200	167
5	2000	126	1000	101	1200	185
5½	1500	104	1000	110	700	115
6	1500	111	900	107	900	165
6½	1300	106	800	117	700	128
7	1200	103	700	98	900	181
7½	1200	108	700	103	600	128
8	1200	117	600	97	800	183
9	1000	107	600	106	400	99
10	700	91	500	104	300	82
11	....	...	....	...	300	88
12	....	...	....	...	300	95

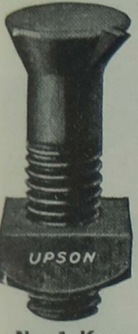
Length Inches	Diameter 7/16-Inch Case Contains	Case Wt. Lbs.	1/2-Inch Case Contains	Case Wt. Lbs.	5/8-Inch Case Contains	Case Wt. Lbs.
1	1800	125	1000	93	...	...
1½	1600	148	900	106	500	97
2	1200	124	1100	159	500	116
2½	1000	121	1200	195	400	108
3	1000	140	1100	205	600	187
3½	700	109	800	170	500	174
4	600	105	900	210	600	226
4½	500	98	700	183	300	128
5	500	106	600	173	400	182
5½	400	88	400	126	375	185
6	500	123	500	170	400	213
6½	400	114	400	148	250	148
7	400	127	500	192	375	223
7½	300	103	250	108	200	132
8	300	109	400	170	250	171
9	300	112	300	143	225	170
10	250	117	300	156	250	210
11	250	124	300	169	250	224
12	250	131	300	187	200	200
13	....	...	300	200	200	210
14	....	...	300	213	200	224
15	....	...	300	227	200	258
16	....	...	300	247	200	272

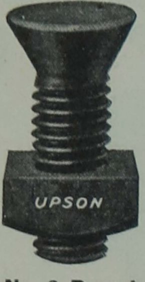
Length Inches	Diameter 3/4-Inch Case Contains	Case Wt. Lbs.	7/8-Inch Case Contains	Case Wt. Lbs.	1-Inch Case Contains	Case Wt. Lbs.
1½	300	97	...	...	...	...
2	300	115	200	...	150	112
2½	250	110	150	...	100	86
3	350	167	250	...	100	95
3½	300	169	275	...	225	229
4	400	234	250	...	200	223
4½	250	160	200	181	175	212
5	300	203	225	219	175	228
5½	250	185	175	184	150	210
6	225	175	200	223	150	224
6½	200	170	150	170	125	199
7	250	226	175	220	125	210
7½	150	150	150	201	120	213
8	200	204	150	211	115	215
9	200	215	150	231	105	215
10	175	216	125	211	100	224
11	150	202	100	185	80	195
12	150	216	100	198	80	209
13	150	232	100	215	75	215
14	150	247	100	231	75	229
15	150	262	100	245	75	242
16	150	277	100	259	75	256

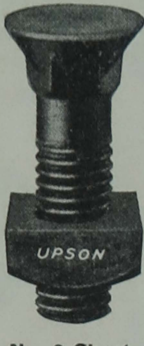
Upson Plow and Cultivator Bolts

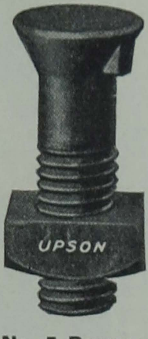
With American Standard Regular Square Nuts

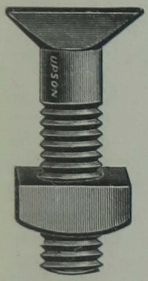
Effective April 1, 1927

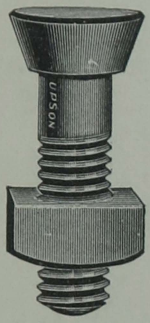

No. 1 Key Head

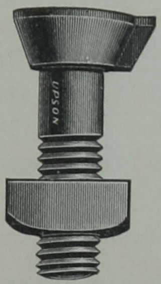

No. 2 Round Countersunk Head

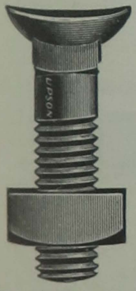

No. 3 Short Square Head

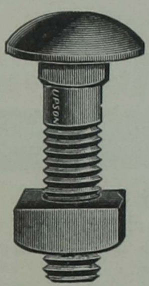

No. 7 Reverse Key Head

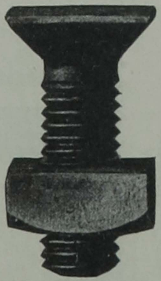

No. 4 Square Countersunk


No. 5 Large Round Countersunk


No. 6 Large Key Head


No. 8 Concave Head


No. 9 Oval Head


No. 10 Tee Head

Style Nos. 1, 2, 3, and 7, per 100

Length Inches	Diameter, Inches					
	5/16	⅜	7/16	½	9/16 and ⅝	¾
¾	$2.05	$2.45	$3.35	$4.75	......	......
1	2.15	2.60	3.55	5.00	......	......
1¼	2.30	2.75	3.75	5.25	$10.40	$15.00
1½	2.45	2.90	4.00	5.50	10.80	15.70
1¾	2.60	3.05	4.25	5.75	11.20	16.40
2	2.75	3.20	4.50	6.00	11.60	17.10
2¼	2.95	3.35	4.75	6.30	12.00	17.80
2½	3.15	3.50	5.00	6.60	12.40	18.50
2¾	3.35	3.75	5.30	6.90	12.80	19.20
3	3.60	4.00	5.65	7.25	13.20	19.90
3¼	3.85	4.40	6.00	7.65	13.60	21.05
3½	4.30	4.90	6.45	8.25	14.00	22.20
3¾	4.75	5.40	6.95	8.90	14.40	23.35
4	5.25	5.95	7.55	9.60	14.80	24.50
4½	5.75	6.50	8.15	10.35	15.80	26.10
5	6.25	7.15	8.75	11.10	16.80	27.70
5½	6.75	7.90	9.45	11.90	17.80	29.30
6	7.25	8.70	10.30	12.75	18.80	30.90

Intermediate lengths take next higher list.

Style Nos. 4, 5, 6, 8, 9, and 10

For head styles Nos. 4, 5, 6, 8, 9, and 10, add the following gross extras to the above lists:

5/16-Inch Diameter	$.50	½-Inch Diameter	$.95
⅜-Inch Diameter	.60	⅝-Inch Diameter	2.00
7/16-Inch Diameter	.75	¾-Inch Diameter	4.00

Bolt Extras

Effective April 1, 1927

Special Heads and Styles—Gross Extras to Be Added to Machine, Blank and Tap Bolt Lists

	Add, per 100 Extra										
	Diameter, Inches										
	3/16, ¼	5/16	⅜	7/16	½	9/16, ⅝	¾	⅞	1	1⅛	1¼
American Standard Regular Hexagon Heads	$.15	$.20	$.30	$.45	$.65	$1.00	$1.40	$2.20	$3.00	$5.00	$7.00
American Standard Heavy (U.S.S.) Square Heads	.33	.45	.65	.95	1.40	2.10	2.60	3.60	5.20	7.70	10.75
American Standard Heavy (U.S.S.) Hexagon Heads	.30	.40	.60	.90	1.30	2.00	2.50	3.50	5.00	7.50	10.50
Manufacturers' Standard T. Askew and Eccentric Heads	.70	1.00	1.40	2.00	3.00	4.50	6.50	10.00	15.00	25.00	35.00
Manufacturers' Standard Button and Round Countersunk Heads, Round Neck, for lots of less than 5000 pieces of a size	.35	.50	.70	1.00	1.50	2.25	3.25	5.00	7.50	12.50	17.50
Joint Bolts with American Standard Regular Square Nuts	.05	.10	.15	.20	.30	.50	.70	1.10	1.50	2.50	3.50
Joint Bolts with Oblong Nuts	.15	.30	.45	.60	.90	1.50	2.10	3.30	4.50	7.50	10.50
Boiler or Fitting-Up Bolts, Swelled Neck, Half-Cone Point, Recessed Square Nuts	....	1.25	1.60	2.20	3.00	4.70	6.70	9.40	14.00	22.00	32.00
Boiler or Fitting-Up Bolts, Plain Neck, Half-Cone Point, American Standard Heavy (U.S.S.) Square Nuts	....	.60	.80	1.10	1.50	2.35	3.35	4.70	7.00	11.00	16.00
For Slotting Button or Countersunk Head, Round Neck, with One Sawed Slot Across Head	.50	.70	1.00	1.50	2.25	3.25	5.00	7.50	12.50	17.50	25.00
American Standard Regular Square or Hexagon Head Machine with One Sawed Slot Across Head	.70	1.00	1.40	2.00	3.00	4.50	6.50	10.00	15.00	25.00	35.00

For Bolts with Nuts Other Than American Standard Regular Hot Pressed Square—Gross Extras to be Added to Machine, Carriage, Plow, Elevator and Hanger Bolt Lists

American Standard Regular H.P. Hexagon Nuts	$.10	$.20	$.30	$.45	$.50	$.90	$1.30	$2.00	$2.90	$3.80	$5.00
American Standard Regular C.P. Square Nuts	....	....	....	....	....	.90	1.45	2.75	4.25	4.50	5.40
American Standard Regular C.P. Hexagon Nuts	.10	.20	.30	.45	.50	.95	1.65	3.25	4.50	5.25	6.50
American Standard Heavy (U.S.S.) H.P. Square Nuts	.25	.40	.65	.80	.95	1.00	1.30	2.10	2.90	3.10	4.00
American Standard Heavy (U.S.S.) H.P. Hexagon Nuts	.30	.50	.80	1.00	1.10	1.20	1.70	2.75	3.80	4.00	5.30
American Standard Heavy (U.S.S.) C.P. Square Nuts	.25	.40	.65	.80	1.00	1.30	2.10	3.30	4.60	4.70	7.60
American Standard Heavy (U.S.S.) C.P. Hexagon Nuts	.35	.50	.80	1.00	1.30	1.65	2.60	4.10	5.80	6.00	9.30
American Standard Heavy (U.S.S.) Semi-Finished Hexagon Nuts	.50	.70	1.00	1.25	1.60	2.20	3.30	4.80	6.70	7.10	10.70
Gross Amount to Be Deducted for Bolts without Nuts	.25	.35	.40	.70	.95	1.90	2.40	3.90	5.30	8.75	11.60

Maximum Lengths of Thread Furnished without Extra Charges

Carriage, Machine and Plow Bolts

Length Bolt, Inches	Diameter, Inches										
	3/16, ¼	5/16	⅜	7/16	½	9/16, ⅝	¾	⅞	1	1⅛	1¼
¾	⅜	⅜	7/16	½	...	...	...	...	...	...	...
⅞ to 1½	¾	¾	¾	13/16	1	1⅛	1⅛	...	...	...	...
1¾ to 2¾	13/16	13/16	13/16	⅞	1	1¼	1½	1½	1½	1¾	2
3 to 4	13/16	13/16	13/16	1	1⅛	1½	1½	1¾	2	2¼	2¼
4¼ to 6½	1⅛	1⅛	1⅛	1⅛	1¼	1⅝	1¾	1⅞	2¼	2¼	2¼
6¾ to 8	1⅛	1⅛	1¼	1¼	1⅜	1⅝	1⅞	2	2¼	2½	2½
8¼ to 10½	1⅛	1⅛	1¼	1⅜	1⅜	1¾	2	2	2½	2½	2½
10¾ to 20	1⅛	1⅛	1¼	1⅜	1½	2	2⅛	2⅜	2¾	2¾	2¾
20¼ to 30	...	...	...	...	1½	2	2¼	2½	2¾	2¾	2¾

Gross Extras to be Added to Lists

	Diameter, Inches										
	3/16, ¼	5/16	⅜	7/16	½	9/16, ⅝	¾	⅝	1	1⅛	1¼
For Each Additional ¼-Inch of Thread	$.10	$.10	$.10	$.15	$.15	$.20	$.30	$.35	$.40	$.45	$.50
For Machine, Carriage and Plow Bolts with Threads Other Than American Standard Coarse, such as S.A.E., V, Acme, etc.	.20	.30	.40	.55	.75	1.05	1.40	2.10	3.00	4.25	5.75
For Left Hand Thread	.20	.30	.40	.55	.75	1.05	1.40	2.10	3.00	4.25	5.75

All threads will be cut to American Standard Coarse (U.S.S.) Thread Series, Class 2, Free Fit.

Boiler Patch Bolts

Finished

Blank

Heads of patch bolts are countersunk at an angle of 45 degrees.

Length of patch bolts is measured from widest part of countersink to end.

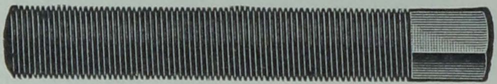
Unless otherwise ordered, patch bolts will be furnished with 12 V threads to the inch, steam-tight. When ordering, always specify whether necked or not.

Length from Largest Diam. of Bevel to Point Inches	Price, per Hundred — Diameter, Inches ½	5/8	¾	7/8	1	1⅛	1¼
¾	$3.75	$4.25	.....	.....	.....	.....	.....
7/8	4.00	4.50	$6.00	.....	.....	.....	.....
1	4.25	4.80	6.50	$9.50	$13.50	.....	.....
1⅛	4.50	5.10	6.80	9.85	14.00	$19.25	.....
1¼	4.75	5.50	7.25	10.25	14.75	20.25	$27.00
1½	5.25	6.50	8.25	11.25	16.25	22.50	30.50
2	....	8.50	10.25	13.25	19.25	27.50	35.00
2½	....	10.50	12.25	15.25	22.25	33.50	42.00

Prices of blank patch bolts quoted on application.

Boiler Staybolts

12 Threads per Inch



Made of extra refined iron.

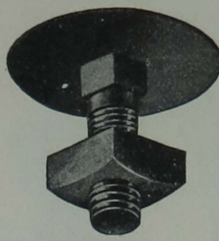
Length Thread 2½ to 12 Inches

Length Thread In.	Price, per 100 — Diameter, Inches ¾	13/16 and 7/8	15/16 and 1	1 1/16 and 1⅛	1¼
2½	$14.20	$20.80	$30.10	......	......
3	14.95	21.80	31.40	......	......
3½	15.70	22.80	32.70	$42.90	$53.40
4	16.45	23.80	34.00	44.40	55.15
4½	17.20	24.80	35.30	45.90	56.90
5	17.95	25.80	36.60	47.40	58.65
5½	18.70	26.80	37.90	48.90	60.40
6	19.45	27.80	39.20	50.40	62.15
6½	20.20	28.80	40.50	51.90	63.90
7	20.95	29.80	41.80	53.40	65.65
7½	21.70	30.80	43.10	54.90	67.40
8	22.50	31.80	44.40	56.40	69.15
9	24.00	33.80	47.00	59.40	72.65
10	25.50	35.80	49.60	62.40	76.15
11	27.00	37.80	52.20	65.40	79.65
12	28.50	39.80	54.80	68.40	83.15

Length Thread Longer than 12 Inches

Diam. Inches	Price per Pound	Diam. Inches	Price per Pound
¾	$.22½	1	$.20
13/16	.21	1 1/16	.20
7/8	.21	1⅛	.20
15/16	.20	1¼	.20

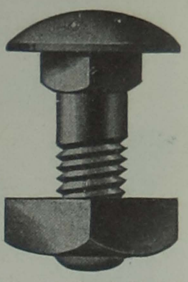
Elevator Bolts



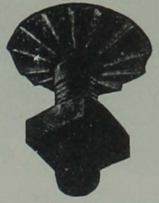
No. 1 Large Countersunk Head

With Finished Points and American Standard Regular Square Nuts

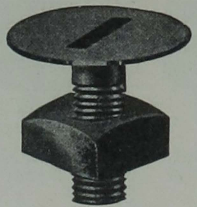
Effective April 1, 1927



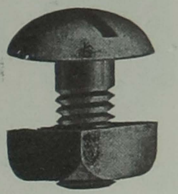
No. 2 Oval Head



No. 4 Corrugated Head



No. 3 Slotted Key Head



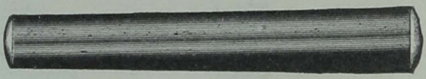
No. 5 Slotted Button Head

Manufacturers' Standard List—Price, per 100

Length Inches	Diameter, Inches 3/16 and ¼	5/16	⅜	Length Inches	Diameter, Inches 3/16 and ¼	5/16	⅜
¾	$3.30	$4.50	$6.00	2	$4.05	$5.75	$8.00
7/8	3.45	4.75	6.40	2¼	4.20	6.00	8.40
1	3.45	4.75	6.40	2½	4.35	6.25	8.80
1¼	3.60	5.00	6.80	2¾	4.50	6.50	9.20
1½	3.75	5.25	7.20	3	4.65	6.75	9.60
1¾	3.90	5.50	7.60	...	....	....	....

STANDARD PACKAGE QUANTITY.—3/16 and ¼ inch, 100; 5/16, ⅜ and 7/16 inch, 50; ½ inch to 10 inches long, inc., 50; ½ inch longer than 10 inches to 20 inches, inc., 25; ⅝ inch to 5 inches long, inc., 50; ⅝ inch longer than 5 inches to 20 inches, 25; ¾ inch up to 20 inches long, inc., 25.

Standard Steel Taper Pins



Taper ¼ inch to the foot.

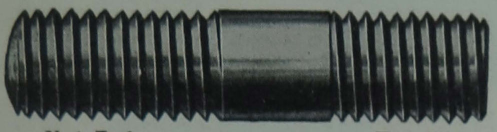
Per 100

No.	0	1	2	3	4	5
Diam. Large End...in.	.156	.172	.193	.219	.250	.289
App. Frac. Sizes.....in.	5/32	11/64	3/16	7/32	¼	19/64
¾	$1.80	$2.00	$2.20	$2.40	$2.70	$3.00
1	2.10	2.30	2.50	2.70	3.00	3.30
1¼	2.40	2.60	2.80	3.00	3.30	3.60
1½	2.70	2.90	3.10	3.30	3.60	3.90
1¾	3.00	3.20	3.40	3.60	3.90	4.20
2	3.30	3.50	3.70	3.90	4.20	4.50
2¼	3.70	3.90	4.10	4.30	4.60	4.90
2½	4.10	4.30	4.50	4.70	5.00	5.30
2¾	....	4.70	4.90	5.10	5.40	5.70
3	....	5.10	5.30	5.50	5.80	6.10
3¼	....	....	....	5.90	6.20	6.50
3½	....	....	....	6.30	6.60	6.90
3¾	....	....	....	....	7.00	7.30
4	....	....	....	....	7.40	7.70

No.	6	7	8	9	10
Diam. Large End.......in.	.341	.409	.492	.591	.706
App. Frac. Sizes........in.	11/32	13/32	½	19/32	23/32
¾	$3.50	.....	.....	.....	.....
1	4.00	$6.50	$7.60	$10.80	$14.40
1¼	4.50	7.00	8.30	11.70	15.30
1½	5.00	7.50	9.00	12.60	16.20
1¾	5.50	8.00	9.70	13.50	17.10
2	6.00	8.50	10.40	14.40	18.20
2¼	6.50	9.40	11.40	15.60	19.70
2½	7.00	10.30	12.40	16.80	21.20
2¾	7.50	11.20	13.40	18.00	22.70
3	8.00	12.10	14.40	19.20	24.20
3¼	8.50	13.00	15.40	20.40	25.90
3½	9.00	13.90	16.40	21.60	27.60
3¾	9.50	14.80	17.40	22.80	29.30
4	10.00	15.70	18.40	24.00	31.00
4¼	10.60	16.70	19.60	25.40	33.00
4½	11.20	17.70	20.80	26.80	35.00
4¾	11.80	18.70	22.00	28.20	37.00
5	12.40	19.70	23.20	29.60	39.00
5½	13.60	21.70	25.60	32.40	43.00
6	14.80	23.70	28.00	35.20	47.00

Steel Studs

Milled From The Bar



Per 100

Diameter........inches	⅜	7/16	½
Threads to Inch	16	14	13
Oval of Point, in Addition to Listed Length			
1¼	$5.40	$6.50	$7.05
1½	5.60	6.75	7.40
1¾	5.85	7.00	7.70
2	6.10	7.20	8.05
2¼	6.35	7.35	8.35
2½	6.60	7.70	8.65
2¾	6.80	7.95	9.00
3	7.05	8.20	9.30
3¼	....	8.40	9.65
3½	....	8.65	9.95
3¾	....	8.90	10.25
4	....	9.25	10.60
4¼	....	....	10.75
4½	....	....	10.90
4¾	....	....	11.20
5	....	....	11.55
5½	....	....	.....
6	....	....	.....
*Add for Each ¼ Inch	.80	1.00	1.25
Quantity per Package	100	50	50

Diameter........inches	⅝	¾	⅞	1
Threads to Inch	11	10	9	8
Oval of Point, in Addition to Listed Length				
1½	$10.10	......	......	......
1¾	10.40	......	......	......
2	10.75	$15.40	......	......
2¼	11.05	15.95	......	......
2½	11.40	16.45	$24.00	......
2¾	11.75	17.00	25.00	......
3	12.05	17.50	26.00	$34.00
3¼	12.40	18.05	27.00	35.50
3½	12.75	18.60	28.00	37.00
3¾	13.05	19.10	29.00	38.50
4	13.40	19.60	30.00	40.00
4¼	13.65	20.05	30.80	41.00
4½	13.90	20.40	31.50	42.00
4¾	14.15	20.85	32.60	43.00
5	14.40	21.20	33.00	44.00
5½	14.85	22.00	34.50	46.00
6	15.35	22.75	36.00	48.00
*Add for Each ¼ Inch	2.00	2.50	4.00	5.50
Quantity per Package	25	25	20	16

*Add for each ¼ in. for lengths not exceeding 7 in.

Length of Threads on Regular Studs

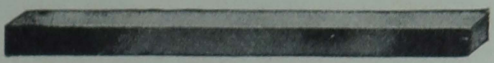
Diam.	⅜		7/16		½		⅝		¾		⅞		1	
Length (Oval of Point, in Addition to Listed Length)	N	T	N	T	N	T	N	T	N	T	N	T	N	T
1	½	½	½	½	..	..	..	..	..	..	...	...	...	...
1¼	⅝	½	⅝	½	⅝	½	⅝	⅝	..	..	...	...	...	...
1½	⅝	½	¾	9/16	¾	½	¾	⅝	..	..	...	...	...	...
1¾	⅝	½	¾	9/16	¾	⅝	⅞	¾	⅞	¾	...	...	...	...
2	¾	½	¾	9/16	¾	⅝	⅞	¾	⅞	⅞	...	...	...	...
2¼	¾	½	¾	9/16	¾	⅝	⅞	¾	⅞	⅞	1	1	...	...
2½	¾	½	¾	9/16	¾	⅝	⅞	¾	⅞	⅞	1⅛	1	1¼	1⅛
2¾	¾	½	¾	9/16	⅞	¾	1	⅞	1	⅞	1⅛	1	1¼	1⅛
3	¾	½	⅞	9/16	⅞	¾	1	⅞	1	⅞	1⅛	1	1¼	1⅛
3¼	..	..	⅞	9/16	1	¾	1	⅞	1	⅞	1⅛	1	1¼	1⅛
3½	..	..	⅞	9/16	1	¾	1	⅞	1¼	⅞	1¼	1	1¼	1⅛
3¾	..	..	1	11/16	1	¾	1¼	⅞	1¼	⅞	1¼	1	1¼	1⅛
4	..	..	1	11/16	1¼	¾	1¼	⅞	1¼	1	1¼	1	1½	1¼
4¼	..	..	...	...	1¼	⅞	1¼	⅞	1½	1	1½	1⅛	1½	1¼
4½	..	..	...	...	1¼	⅞	1¼	⅞	1½	1	1½	1⅛	1¾	1¼
4¾	..	..	...	...	1¼	⅞	1¼	⅞	1½	1	1½	1⅛	1¾	1¼
5	..	..	...	...	1¼	⅞	1½	⅞	1½	1	1¾	1⅛	2	1¼
5¼	..	..	...	...	...	..	1½	⅞	1½	1	1¾	1⅛	2	1½
5½	..	..	...	...	...	..	1½	⅞	1¾	1	1¾	1⅛	2	1½
5¾	..	..	...	...	...	..	1½	⅞	1¾	1	1¾	1¼	2	1½
6	..	..	...	...	...	..	1½	⅞	1¾	1	1¾	1¼	2	1½

(N—Nut End; T—Tap End.)
Studs carried in stock with N.C. (U.S.S.) threads only.

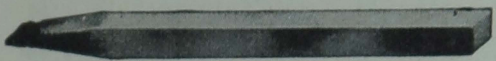
Drift Bolts

Hot Galvanized or Plain

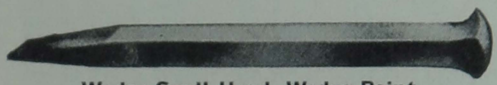
Square



Plain, No Head, No Point

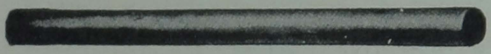


Wedge Point, No Head

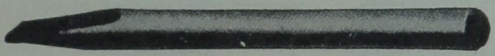


Wedge Swell Head, Wedge Point

Round



Plain, No Head, No Point

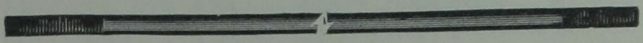


Wedge Point, No Head

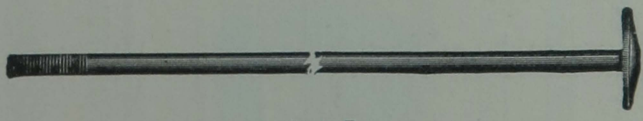
Furnished in any diameter or any length desired.

Prices upon application.

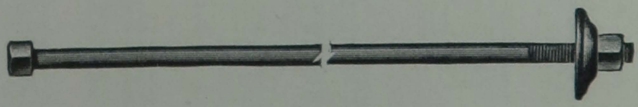
Stay Rods



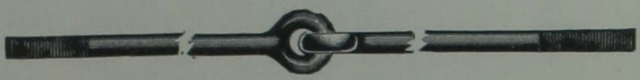
Style A



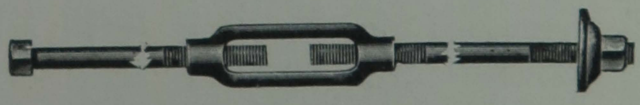
Style B



Style C



Style D

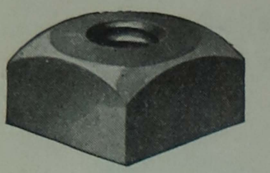


Style E

Can furnish stay or truss rods of any length made in any style, as per above illustrations, with regular or upset ends, with hexagon or square nuts. Also cast washers, round, square or bevel. Also wrought iron washers, either round or square of any size.

Specify fully in ordering.

Prices upon application.



Square Hot Pressed Nuts

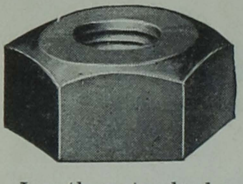
Amer. Standard Heavy (U.S.S.) Single Chamfer

Effective July 1, 1927

Tapping left hand or other than Coarse (U.S.S.) thread, prices on application.

Per 100 in Full Containers

Size Bolt In.	Width In.	Thickness, In. U.S.S.	Thickness, In. Jam	Blank Per 100	Blank Wt., Lbs. per 1000	Tapped Per 100	Tapped Wt., Lbs. per 1000
¼	½	¼	3/16	$.50	14.0	$.55	13.4
5/16	19/32	5/16	7/32	.70	23.1	.75	22.0
⅜	11/16	⅜	¼	1.00	38.0	1.05	36.2
7/16	25/32	7/16	9/32	1.40	56.7	1.50	53.9
½	⅞	½	5/16	1.85	80.1	2.00	76.1
9/16	15/16	9/16	11/32	2.10	109.3	2.30	103.9
⅝	1 1/16	⅝	⅜	2.55	145.0	2.70	137.7
¾	1 ¼	¾	7/16	3.60	236.7	3.80	225.0
⅞	1 7/16	⅞	½	5.65	360.8	6.10	343.0
1	1 ⅝	1	9/16	7.80	523.3	8.30	497.0
1 ⅛	1 13/16	1 ⅛	⅝	11.25	729.8	11.90	692.1
1 ¼	2	1 ¼	¾	14.85	973.0	15.60	926.0
1 ⅜	2 3/16	1 ⅜	13/16	20.10	1283.4	21.00	1217.7
1 ½	2 ⅜	1 ½	⅞	26.95	1631.9	28.15	1552.8
1 ⅝	2 9/16	1 ⅝	15/16	38.90	2051.6	40.85	1951.7
1 ¾	2 ¾	1 ¾	1	50.40	2548.2	52.50	2419.3
1 ⅞	2 15/16	1 ⅞	1 1/16	66.20	3087.6	69.10	2938.9
2	3 ⅛	2	1 ⅛	75.00	3737.1	76.60	3549.5
2 ¼	3 ½	2 ¼	....	130.00	5206.8	143.00	4693.1
2 ½	3 ⅞	2 ½	....	182.00	7070.4	200.00	6738.1
2 ¾	4 ¼	2 ¾	....	230.00	8794.8	250.00	8307.3
3	4 ⅝	3	....	332.00	11366.1	360.00	10816.5
3 ¼	5	3 ¼	....	650.00	....	690.00	....
3 ½	5 ⅜	3 ½	....	790.00	....	850.00	....
3 ¾	5 ¾	3 ¾	....	1090.00	....	1169.00	....
4	6 ⅛	4	....	1310.00	....	1400.00	....



Hexagon Hot Pressed Nuts

Amer. Standard Heavy (U.S.S.) Single Chamfer

Effective July 1, 1927

Tapping left hand or other than Coarse (U.S.S.) thread, prices on application.

Double chamfered nuts take 10% higher list.

Less than standard container quantities take 10% higher list.
Nuts packed in cartons or small packages take 15% higher list.

Per 100 in Full Containers

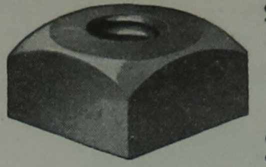
Size Bolt In.	Width In.	Thickness, In. U.S.S.	Thickness, In. Jam	Blank Per 100	Blank Wt., Lbs. per 1000	Tapped Per 100	Tapped Wt., Lbs. per 1000
¼	½	¼	3/16	$.60	12.4	$.65	11.8
5/16	19/32	5/16	7/32	.85	20.4	.90	19.3
⅜	11/16	⅜	¼	1.15	33.4	1.20	31.6
7/16	25/32	7/16	9/32	1.65	49.7	1.75	46.9
½	⅞	½	5/16	2.10	70.1	2.25	66.1
9/16	15/16	9/16	11/32	2.35	95.5	2.55	90.1
⅝	1 1/16	⅝	⅜	2.80	126.5	3.00	119.2
¾	1 ¼	¾	7/16	4.05	205.8	4.30	194.1
⅞	1 7/16	⅞	½	6.30	312.8	6.80	295.0
1	1 ⅝	1	9/16	8.75	453.3	9.30	427.0
1 ⅛	1 13/16	1 ⅛	⅝	12.35	631.6	13.10	593.9
1 ¼	2	1 ¼	¾	16.50	839.5	17.35	792.5
1 ⅜	2 3/16	1 ⅜	13/16	22.30	1107.9	23.30	1042.2
1 ½	2 ⅜	1 ½	⅞	29.95	1405.5	31.30	1326.4
1 ⅝	2 9/16	1 ⅝	15/16	43.25	1765.8	45.40	1665.9
1 ¾	2 ¾	1 ¾	1	56.00	2193.9	58.30	2075.0
1 ⅞	2 15/16	1 ⅞	1 1/16	73.50	2653.2	76.80	2504.5
2	3 ⅛	2	1 ⅛	81.20	3213.0	85.15	3025.4
2 ¼	3 ½	2 ¼	....	113.40	4464.4	122.20	4220.7
2 ½	3 ⅞	2 ½	....	155.90	6058.3	170.20	5726.0
2 ¾	4 ¼	2 ¾	....	207.40	7908.6	226.00	7421.1
3	4 ⅝	3	....	310.80	10626.0	338.00	10076.4
3 ¼	5	3 ¼	....	511.40	12708.8	540.00	11956.8
3 ½	5 ⅜	3 ½	....	631.00	15933.0	666.70	14854.0
3 ¾	5 ¾	3 ¾	....	850.00	19129.0	893.30	17892.3
4	6 ⅛	4	....	1020.00	23199.2	1070.00	21838.0

Number of Blank or Tapped Nuts in 200-Lb. Containers

Size In.	U.S.S. Sq.	U.S.S. Hex.	Size In.	U.S.S. Sq.	U.S.S. Hex.	Size In.	U.S.S. Sq.	U.S.S. Hex.	Size In.	U.S.S. Sq.	U.S.S. Hex.
¼	14000	15000	¾	900	1000	1 ⅝	100	120	3	16	20
5/16	8400	9000	⅞	550	650	1 ¾	80	95	3 ¼	13	15
⅜	5000	6000	1	450	500	1 ⅞	65	80	3 ½	12	12
7/16	3150	3600	1 ⅛	300	350	2	55	65	3 ¾	8	10
½	2800	3300	1 ¼	225	270	2 ¼	45	48	4	6	8
9/16	2000	2300	1 ⅜	175	200	2 ½	35	42	...	..	..
⅝	1500	1800	1 ½	130	150	2 ¾	25	25	...	..	..

No. of Tapped Nuts in Standard Cartons and Cases

Size Nut In.	Contents Carton	Contents Case	Square Nuts Weight, Pounds Carton	Square Nuts Weight, Pounds Case	Hexagon Nuts Weight, Pounds Carton	Hexagon Nuts Weight, Pounds U.S.S. Case
¼	100	8000	1.5	129	1.3	112
5/16	100	5000	2.5	134	2.2	117
⅜	100	5600	4.0	237	3.5	207
7/16	50	3400	3.0	217	2.5	185
½	50	2800	4.2	247	3.5	211
9/16	50	1800	5.4	204	4.8	182
⅝	50	2000	7.3	307	5.9	251
¾	50	1000	12.5	265	9.5	203
⅞	25	600	9.3	235	7.3	189
1	25	400	13.6	232	11.0	190



Square Cold Punched Nuts

Amer. Standard Heavy (U.S.S.) Single Chamfer

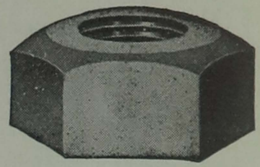
Effective July 1, 1927

Tapping left hand or other than Coarse (U.S.S.) thread, prices on application.

Per 100 in Full Containers

Size Bolt Inches	Width Inches	Thickness Inches	Hole Inches	Blank Wt., Lbs. per 1000	Blank Price per 100	Tapped Wt., Lbs. per 1000	Tapped Price per 100
¼	½	¼	3/16	14.4	$.50	13.8	$.55
5/16	19/32	5/16	¼	23.9	.70	22.8	.75
⅜	11/16	⅜	19/64	39.2	1.00	37.4	1.05
7/16	25/32	7/16	11/32	58.5	1.40	55.7	1.50
½	⅞	½	13/32	82.6	1.85	78.6	2.00
9/16	15/16	9/16	29/64	116.0	2.60	109.8	2.80
⅝	1 1/16	⅝	33/64	154.3	3.05	147.0	3.25
¾	1 ¼	¾	⅝	250.0	4.40	237.1	4.60
⅞	1 7/16	⅞	47/64	384.0	6.75	371.0	7.20
1	1 ⅝	1	27/32	542.8	9.50	518.1	10.00
1 ⅛	1 13/16	1 ⅛	15/16	760.0	13.30	725.4	14.00
1 ¼	2	1 ¼	1 1/16	1004.0	18.50	957.0	19.60
1 ⅜	2 3/16	1 ⅜	1 5/32	1324.3	32.00	1257.6	33.50
1 ½	2 ⅜	1 ½	1 9/32	1684.0	43.30	1604.9	45.20

Hexagon Cold Punched Nuts



Amer. Standard Heavy (U.S.S.) Single Chamfer

Effective July 1, 1927

Tapping left hand or other than Coarse (U.S.S.) thread, prices on application.

Per 100 in Full Containers

Size Bolt Inches	Width Inches	Thickness Inches	Hole Inches	Blank Wt., Lbs. per 1000	Blank Price per 100	Tapped Wt., Lbs. per 1000	Tapped Price per 100
¼	½	¼	3/16	12.8	$.60	12.2	$.65
5/16	19/32	5/16	¼	21.0	.85	19.9	.90
⅜	11/16	⅜	19/64	34.5	1.15	32.7	1.20
7/16	25/32	7/16	11/32	51.2	1.65	48.4	1.75
½	⅞	½	13/32	72.4	2.10	68.4	2.25
9/16	15/16	9/16	29/64	100.0	2.90	97.2	3.10
⅝	1 1/16	⅝	33/64	129.6	3.40	122.3	3.60
¾	1 ¼	¾	⅝	212.3	4.80	202.3	5.10
⅞	1 7/16	⅞	47/64	331.9	7.50	314.1	8.00
1	1 ⅝	1	27/32	467.7	10.55	441.4	11.15
1 ⅛	1 13/16	1 ⅛	15/16	654.9	14.80	617.2	15.55
1 ¼	2	1 ¼	1 1/16	866.3	20.50	819.3	21.40
1 ⅜	2 3/16	1 ⅜	1 5/32	1143.2	27.80	1077.5	28.80
1 ½	2 ⅜	1 ½	1 9/32	1450.0	37.30	1371.0	38.70
1 ⅝	2 9/16	1 ⅝	1 13/32	1822.0	53.90	1722.0	56.05
1 ¾	2 ¾	1 ¾	1 ½	2264.0	73.35	2135.0	75.70
1 ⅞	2 15/16	1 ⅞	1 ⅝	2738.0	91.65	2588.0	94.95
2	3 ⅛	2	1 23/32	3182.0	108.85	2994.0	112.90
2 ¼	3 ½	2 ¼	1 61/64	4558.0	159.55	4314.0	168.40
2 ½	3 ⅞	2 ½	2 3/16	6274.0	238.40	5942.0	252.60
2 ¾	4 ¼	2 ¾	2 7/16	8089.0	307.40	7603.0	326.00
3	4 ⅝	3	2 11/16	10815.0	410.80	10234.0	438.00
3 ¼	5	3 ¼	2 15/16	13114.0	611.40	12362.0	640.00
3 ½	5 ⅜	3 ½	3 5/32	16442.0	781.00	15363.0	816.70
3 ¾	5 ¾	3 ¾	3 ⅜	19740.0	983.30	18503.0	1026.70
4	6 ⅛	4	3 9/16	23829.0	1186.70	22310.0	1236.70

Number of Blank or Tapped Nuts in 200-Lb. Containers

Less than standard container quantities, 10% higher list.

Size In.	U.S.S. Sq.	U.S.S. Hex.	Size In.	U.S.S. Sq.	U.S.S. Hex.	Size In.	U.S.S. Sq.	U.S.S. Hex.	Size In.	U.S.S. Sq.	U.S.S. Hex.
¼	14000	15000	¾	900	1000	1⅝	100	120	3	16	20
5/16	8400	9000	⅞	550	650	1¾	80	95	3¼	13	15
⅜	5000	6000	1	450	500	1⅞	65	80	3½	12	12
7/16	3150	3600	1⅛	300	350	2	55	65	3¾	8	10
½	2800	3300	1¼	225	270	2¼	45	48	4	6	8
9/16	2000	2300	1⅜	175	200	2½	35	42	...	...	..
⅝	1500	1800	1½	130	150	2¾	25	25	...	..	..

Number of Tapped Nuts in Standard Cartons and Cases

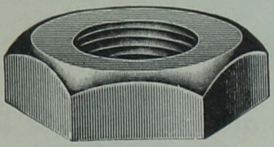
Nuts packed in cartons, as listed below, take 15% higher list than when packed in bulk.

Size Nut In.	Contents Carton	Contents Case	Square Nuts Weight, Pounds Carton	Square Nuts Weight, Pounds Case Gross	Hexagon Nuts Weight, Pounds Carton	Hexagon Nuts Weight, Pounds Case Gross
¼	100	8000	1.5	129	1.3	112
5/16	100	5000	2.5	134	2.2	117
⅜	100	5600	4.0	237	3.5	207
7/16	50	3400	3.0	217	2.5	185
½	50	2800	4.2	247	3.5	211
9/16	50	1800	5.4	204	4.8	182
⅝	50	2000	7.3	307	5.9	251
¾	50	1000	12.5	265	9.5	203
⅞	25	600	9.3	235	7.3	189
1	25	400	13.6	232	11.0	190

Cold Punched Hexagon Jam Nuts

American Standard Heavy (U.S.S.) Single Chamfer

Effective July 1, 1927



Per 100 in Full Containers

Size Bolt In.	Width In.	Thickness In.	Hole In.	No. in 200-Lb.	Blank Wt., Lbs. per 1000	Blank Price per 100	Tapped Wt., Lbs. per 1000	Tapped Price per 100
1/4	1/2	3/16	13/64	22000	9.0	$.55	8.6	$.60
5/16	19/32	7/32	1/4	12500	14.0	.70	13.3	.80
3/8	11/16	1/4	19/64	9000	22.2	1.00	21.4	1.10
7/16	25/32	9/32	11/32	5100	37.5	1.50	36.5	1.60
1/2	7/8	5/16	13/32	5300	46.0	1.70	44.7	1.90
9/16	15/16	11/32	29/64	3600	61.2	2.30	58.8	2.60
5/8	1 1/16	3/8	33/64	3000	79.8	2.50	75.6	2.80
3/4	1 1/4	7/16	5/8	1800	126.0	4.10	119.6	4.60
7/8	1 7/16	1/2	47/64	1200	188.4	5.80	179.6	6.40
1	1 5/8	9/16	27/32	850	256.5	7.80	241.2	8.50
1 1/8	1 13/16	5/8	15/16	640	370.5	11.70	353.8	12.50
1 1/4	2	3/4	1 1/16	440	561.6	17.00	537.6	18.00
1 3/8	2 3/16	13/16	1 5/32	350	.....	23.50	......	24.50
1 1/2	2 3/8	7/8	1 9/32	260	.....	31.50	.....	33.00
1 5/8	2 9/16	15/16	1 25/64	220	.....	40.60	.....	42.50
1 3/4	2 3/4	1	1 1/2	160	.....	55.00	.....	57.00
1 7/8	2 15/16	1 1/16	1 5/8	140	.....	65.50	.....	68.00
2	3 1/8	1 1/8	1 23/32	110	.....	75.60	.....	79.00

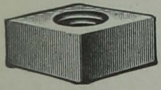
Less than standard container quantities take 10% higher list.

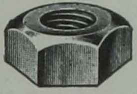
Double chamfered nuts take 10% higher lists.

Tapping left hand or other than Coarse (U.S.S.) thread, prices on application.

Machine Screw Nuts

Square and Hexagon

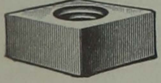


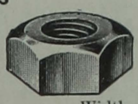


Screw Size	Steel, per Gross Square	Steel, per Gross Hexagon	Brass, per Gross Square	Brass, per Gross Hexagon	Thread Coarse	Thread Fine	Diam. Flats In.	Thickness In.
2	$.40	$.45	$.95	$.95	56	64	3/16	1/16
3	.40	.45	.95	.95	48	56	3/16	1/16
4	.31	.34	.80	.80	40	48	1/4	3/32
5	.33	.36	1.00	1.00	40	44	5/16	7/64
6	.33	.36	1.00	1.00	32	40	5/16	7/64
8	.35	.40	1.25	1.25	32	36	11/32	1/8
10	.37	.43	1.40	1.40	24	32	3/8	1/8
12	.56	.63	2.40	2.40	24	28	7/16	5/32
1/4	.63	.72	2.80	2.80	20	28	7/16	3/16
5/16	1.10	1.35	5.70	5.70	18	24	9/16	7/32
3/8	1.50	1.70	7.80	7.80	16	24	5/8	1/4

Hexagon and Square Steel Stove Bolt Nuts

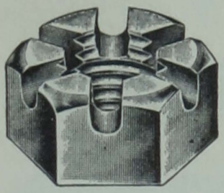
Effective March 1, 1933





Size Screw	Hexagon per 1000	Square per 1000	Coarse Thread	Fine Thread	Width Across Flats In.	Thickness In.
2	$.96	$.86	56	64	3/16	1/16
3	.96	.86	48	56	3/16	1/16
4	.72	.64	40	48	1/4	3/32
5	.80	.72	40	44	5/16	7/64
6	.80	.72	32	40	5/16	7/64
8	.88	.78	32	36	11/32	1/8
10	.96	.82	24	32	3/8	1/8
12	1.40	1.25	24	28	7/16	5/32
1/4	1.60	1.40	20	28	7/16	3/16
5/16	3.00	2.50	18	24	9/16	7/32
3/8	3.80	3.40	16	24	5/8	1/4

Semi-Finished Slotted Hexagon Nuts



American Standard Heavy

Top is flat and chamfered. Bearing surface is washer faced, and at right angle to the axis of the threaded hole.

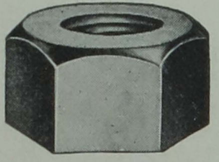
Diam. Bolt In.	Per 100	No. Threads per In.	Max. Width Across Flats, In.	Nom. Thick. In.	Width Slot In.	Depth Slot In.	No. in Std. Ctr.
1/4	...	20	1/2	15/64	3/32	3/32	15000
5/16	...	18	19/32	19/64	1/8	1/8	9000
3/8	...	16	11/16	23/64	1/8	1/8	6000
7/16	...	14	25/32	27/64	1/8	5/32	3600
1/2	...	13	7/8	31/64	5/32	3/16	3300
9/16	...	12	15/16	35/64	5/32	3/16	2300
5/8	...	11	1 1/16	39/64	1/4	1/4	1800
3/4	...	10	1 1/4	47/64	1/4	9/32	1000
7/8	...	9	1 7/16	55/64	5/16	11/32	650
1	...	8	1 5/8	63/64	5/16	11/32	500
1 1/8	...	7	1 13/16	1 7/64	3/8	1/2	350
1 1/4	...	7	2	1 7/32	3/8	1/2	270
1 3/8	...	6	2 3/16	1 11/32	3/8	1/2	200
1 1/2	...	6	2 3/8	1 15/32	3/8	1/2	150
1 5/8	...	5 1/2	2 9/16	1 19/32	3/8	1/2	120
1 3/4	...	5	2 3/4	1 23/32	7/16	9/16	95
1 7/8	...	5	2 15/16	1 27/32	7/16	9/16	80
2	...	4 1/2	3 1/8	1 31/32	7/16	9/16	65
2 1/4	...	4 1/2	3 1/2	2 13/64	7/16	9/16	48
2 1/2	...	4	3 7/8	2 29/64	9/16	11/16	42
2 3/4	...	4	4 1/4	2 45/64	9/16	11/16	25
3	...	3 1/2	4 5/8	2 61/64	5/8	3/4	20
3 1/4	...	3 1/2	5	3 3/16	5/8	3/4	15
3 1/2	...	3 1/4	5 3/8	3 7/16	5/8	3/4	12
3 3/4	...	3	5 3/4	3 11/16	5/8	3/4	10
4	...	3	6 1/8	3 15/16	5/8	3/4	8

Hexagon Semi-Finished Nuts

Full Thickness and Jam Sizes

U.S. Standard

List Effective April 1, 1927



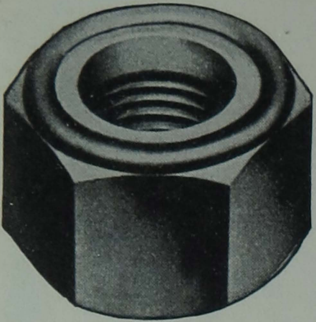
Size Inches	In Cartons Per 100	No. of Threads	No. of Nuts in Standard Container Full	No. of Nuts in Standard Container Jam	Width Across Flats Inches	Thickness Inches Full	Thickness Inches Jam
1/4	$.86	20	12000	18000	1/2	1/4	3/16
5/16	1.15	18	7500	10000	19/32	5/16	7/32
3/8	1.55	16	4500	7000	11/16	3/8	1/4
7/16	2.19	14	4700	4000	25/32	7/16	9/32
1/2	2.76	13	3200	5300	7/8	1/2	5/16
9/16	3.80	12	2300	3600	31/32	9/16	11/32
5/8	4.60	11	1600	3000	1 1/16	5/8	3/8
3/4	6.56	10	1000	1800	1 1/4	3/4	7/16
7/8	10.06	9	650	1200	1 7/16	7/8	1/2
1	13.80	8	500	750	1 5/8	1	9/16
1 1/8	19.21	7	350	640	1 13/16	1 1/8	5/8
1 1/4	26.11	7	270	440	2	1 1/4	3/4
1 3/8	36.80	6	200	350	2 3/16	1 3/8	13/16
1 1/2	48.19	6	150	260	2 3/8	1 1/2	7/8
1 3/4	93.04	5	95	160	2 3/4	1 3/4	1
2	135.70	4 1/2	65	110	3 1/8	2	1 1/8

For nuts with left hand thread, prices on application.

For tapping other than American National Standard Coarse Threads, prices on application.

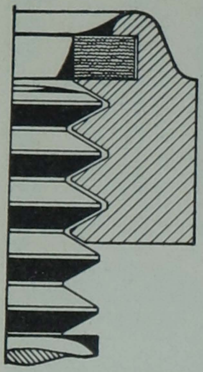
Semi-finished nuts with double countersink, prices on application.

Self Locking Elastic Stop Nuts



The Elastic Stop Nut is an ordinary nut with its height increased to incorporate an unthreaded ring of tough, bone-hard vulcanized red fibre. The fibre is held securely in its recess by rolling in the end of the nut.

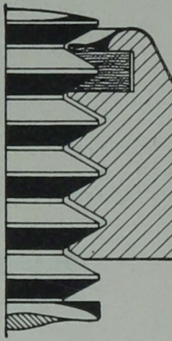
This stop nut makes a perfect fit of the ordinary commercial screw connection. When the bolt meets the unthreaded fibre collar the nut is forced upward, which corresponds with the upward pressure on the base of an ordinary nut when it is drawn home. The Elastic Stop Nut's upward pressure cannot relax, even momentarily, once bolt depresses its way through the fibre.



Before

Before the bolt reaches the unthreaded fibre collar, the threads of an Elastic Stop Nut correspond to the threads of a standard nut and act in the same way. Note the play on both the upper and lower sides of the bolt threads. Such play is inevitable where auxiliary locking devices such as lock washers, cotter pins, etc. are used. Nuts back off because of this play between the two units.

After



As the bolt reaches and passes through the fibre collar, it forces the nut upward until all play is eliminated and the thread flanks are pressed in permanent contact. This contact causes considerable metallic friction which is increased as the nut is drawn home. No relaxation of this upward pressure can take place as long as the bolt remains in the fibre collar. Thus, commercially threaded nuts and bolts are forced into gauge tight fits.

U. S. Standard

Size Inches	Per 100	No. of Threads	Hex Inches	Height Inches	Wt., Lbs. per 100
1/4	$2.20	20	1/2	3/8	1.3
5/16	2.65	18	9/16	29/64	2.1
3/8	3.90	16	11/16	35/64	3.9
7/16	4.60	14	3/4	39/64	6.7
1/2	5.50	13	7/8	45/64	8.
9/16	7.10	12	5/16	13/16	12.
5/8	9.60	11	1 1/16	7/8	15.
3/4	12.50	10	1 1/4	1	22.
7/8	16.75	9	1 7/16	1 1/8	35.
1	25.00	8	1 5/8	1 9/32	50.
1 1/8	43.00	7	1 13/16	1 7/16	69.
1 1/4	53.00	7	2	1 5/8	100.
1 3/8	98.00	6	2 3/16	1 3/4	125.
1 1/2	110.00	6	2 3/8	1 7/8	150.
1 3/4	178.00	5	2 3/4	2 5/16	240.
2	260.00	4 1/2	3 1/8	2 7/16	338.

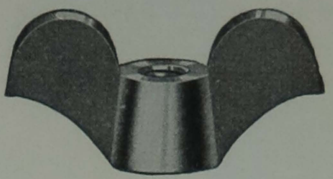
S.A.E. Standard

Size Inches	Per 100	No. of Threads	Hex Inches	Height Inches	Wt., Lbs. per 100
1/4	$1.95	28	7/16	5/16	.85
5/16	2.20	24	1/2	25/64	1.00
3/8	2.60	24	9/16	29/64	1.70
7/16	3.10	20	5/8	17/32	2.25
1/2	4.35	20	3/4	19/32	4.35
9/16	6.00	18	7/8	11/16	7.5
5/8	7.60	18	15/16	3/4	8.5
3/4	9.45	16	1 1/16	7/8	13.5
7/8	12.25	14	1 1/4	1	18.8
1	16.20	14	1 7/16	1 1/8	28.8

Standard Machine Screw Sizes

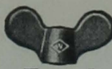
Size Inches	Per 100	No. of Threads	Hex Inches	Height Inches	Wt., Lbs. per 100
No. 3	$1.35	48	1/4	9/64	.17
No. 4	1.35	40	1/4	9/64	.16
No. 6	1.40	32	5/16	11/64	.33
No. 8	1.55	32	3/8	15/64	.51
No. 10	1.60	32	3/8	15/64	.50
No. 10	1.60	24	3/8	15/64	.50

Malleable Iron Wing Nuts

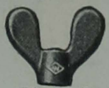


Diam. In.	Thds. per In.	Per 100
3/16	24	$1.10
1/4	20	1.30
5/16	18	1.60
3/8	16	2.15
7/16	14	2.75
1/2	13 or 12	3.70
5/8	11	6.00
3/4	10	7.00

Williams' Blank or Tapped Drop-Forged Thumb Nuts



Type A



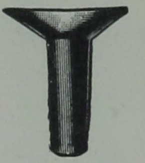
Type B

Drop-forged from steel; furnished either blank or tapped, tumbled smooth. Tapped nuts have base faced at right angle to hole. U.S. Std. threads in stock; other threads supplied to order. Special sizes and shapes furnished to order. When tapping is ordered, a commercial product is furnished. If additional accuracy is required an extra charge will be made.

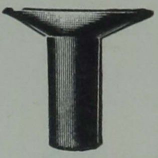
When ordering indicate pattern by letter. Unless otherwise specified, blanks will be sent.

Size Bolt In.	Blank Per 100	Tapped Per 100	U.S. Std. Threads	Diam. Top In.	Size Bolt In.	Blank Per 100	Tapped Per 100	U.S. Std. Threads	Diam. Top In.
1/8	$3.50	$9.00	32	1/4	7/16	$8.00	$20.00	14	5/8
3/16	4.00	10.00	24	5/16	1/2	10.00	25.00	13	21/32
1/4	4.50	11.00	20	3/8	9/16	12.00	30.00	12	3/4
5/16	5.20	13.00	18	7/16	5/8	14.50	34.00	11	13/16
3/8	6.50	16.00	16	17/32	3/4	21.00	46.00	10	15/16

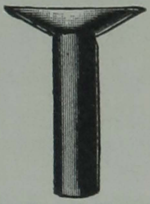
Copper Belt Rivets and Burrs



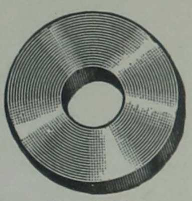
No. 8 Rivet



No. 6 Rivet



No. 7 Rivet



No. 4 Burr

Net Extras to be added to Base Price per Pound

Gauge No.	Rivets, Uniform Lengths: Bulk or 1 Lb. Boxes	Rivets, Uniform Lengths: 1/2 or 3/4-Lb. Boxes	Rivets, Uniform Lengths: 1/4-Lb. Boxes	Rivets, Assorted Lengths: 1-Lb. Boxes	Rivets, Assorted Lengths: 1/2-Lb. Boxes	Rivets, Assorted Lengths: 1/4-Lb. Boxes	Burrs Only Bulk or 1-Lb. Boxes
3 to 9	Base	$.01	$.02 1/2	$.01 1/2	$.02 1/2	$.04	Base
10	$.01	.02	.03 1/2	.02 1/2	.03 1/2	.05	$.01
11–12	.03	.04	.05 1/2	.04 1/2	.05 1/2	.07	.03
13–14–15	.06	.07	.08 1/2	.07 1/2	.08 1/2	.10	.06

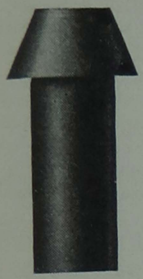
Copper Belt Rivets and Burrs

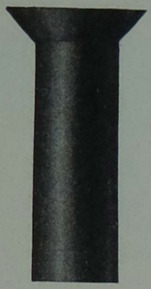
Number to the Pound

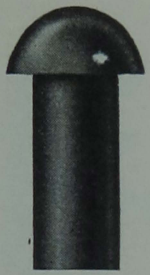
No.	Rivets, Only — Size, Inches: 1/4	5/16	3/8	7/16	1/2	9/16	5/8
4	...	...	54	...	50	...	44
5	...	...	67	...	56	...	52
6	...	...	112	...	96	...	83
7	203	186	171	150	143	135	127
8	240	213	206	187	180	157	150
9	320	304	260	231	208	194	183
10	386	335	304	271	256	234	216
11	457	416	351	340	289	277	249
12	525	465	412	367	330	307	287
13	650	605	510	458	422	407	363
14	871	810	702	639	579	536	490
15	1263	1075	934	876	755	730	628

No.	Rivets, Only — Size, Inches: 3/4	7/8	1	1 1/8	1 1/4	1 1/2	Burrs Only
4	40	37	34	...	29	24	76
5	48	44	40	37	35	30	89
6	73	64	57	54	49	42	184
7	112	99	89	80	74	62	358
8	133	120	105	94	86	72	465
9	160	143	129	115	108	93	571
10	192	165	147	136	121	104	750
11	217	192	172	164	153	126	908
12	244	212	191	174	160	136	1243
13	305	278	249	227	204	180	1450
14	435	377	336	...	276	...	2071
15	540	480	420	...	...	...	3270

Boiler and Structural Rivets


Cone Head


Countersunk


Button Head

Average Number of Cone Head Rivets in 100 Pounds

Length Inches	Diameter, Inches 3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8
3/4	1965	1429	1092	944	665	...	...	...
7/8	1848	1335	1027	846	597	...	...	...
1	1692	1222	940	763	538	450	...	...
1 1/8	1512	1092	840	726	512	415	...	...
1 1/4	1437	1036	797	691	487	389	356	228
1 3/8	1368	988	760	653	460	370	329	211
1 1/2	1300	949	730	624	440	357	280	180
1 5/8	1260	924	711	596	420	340	271	174
1 3/4	1200	900	693	553	390	325	262	169
1 7/8	1156	840	648	532	375	312	257	165
2	1100	789	608	511	360	297	243	156
2 1/8	1031	744	573	502	354	289	237	152
2 1/4	999	721	555	491	347	280	232	149
2 1/2	945	682	525	475	335	260	220	141
2 3/4	900	650	500	443	312	242	208	133
3	828	598	460	411	290	224	197	127
3 1/4	779	562	433	379	267	212	180	115
3 1/2	743	536	413	352	248	201	169	108
3 3/4	715	513	395	341	241	192	160	102
4	...	...	...	326	230	184	158	99
4 1/4	...	...	...	312	220	177	150	96
4 1/2	...	...	...	298	210	171	146	94
4 3/4	...	...	...	284	200	166	138	89
5	...	...	...	270	190	164	135	87
5 1/4	...	...	...	256	180	156	130	84
5 1/2	...	...	...	244	172	151	124	80
5 3/4	...	...	...	233	164	145	120	77
6	...	...	...	223	157	140	115	74
6 1/4	...	...	...	213	150	138	111	71
6 1/2	...	...	...	207	146	134	107	69
6 3/4	...	...	...	203	143	129	104	67
7	...	...	...	198	140	125	100	64

Standard List of Base Sizes and Extras

Adopted April 1, 1927

In Bags or Kegs Weighing Approximately 200 to 300 Pounds

Standard Styles of Heads—Button and Cone

Base Diameters—3/4 and 7/8-Inch

Base Lengths—2 to 5 Inches Inclusive

	Extras per 100 Pounds
1/2-Inch Diameter	$.35
5/8-Inch Diameter	.15
1-Inch Diameter	.05
1 1/8-Inch Diameter	.15
1 1/4-Inch Diameter	.25

9/16, 11/16, 13/16, 15/16 and 1 1/16-inch diameters, subject to same extras as nearest smaller diameters, plus 25 cents net per 100 pounds.

Lengths, 1-Inch and Shorter	.25
Lengths Longer than 1-Inch up to and Including 1 15/16	.15
Lengths Longer than 5-Inch	.25
Steeple Head Rivets	.25
Standard Countersunk Head Rivets	.25
Pan Head Rivets	.15
Swell Neck Rivets	.10

Special shape or sized heads other than style and standard above listed, price on application.

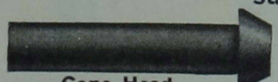
Annealing Rivets for Cold Driving	.50
Rivets Packed in 100 to 199-Pound Kegs	.50

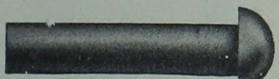
Broken packages of less than 100 pounds of a size, $1.00 net extra will be added for each package. Cost of testing and inspection, if any, to be at customer's expense.

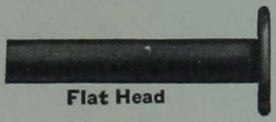
Small Rivets

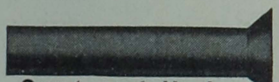
Open Hearth Basic Steel, Annealed Soft

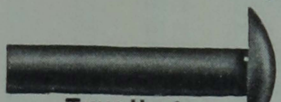
Standard Heads

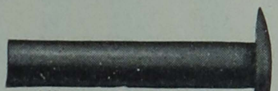

Cone Head


Round Head


Flat Head


Countersunk Head


Truss Head


Wagon Box Head

Effective August 11, 1931

Per Pound—In 200-Pound Kegs

Diameter	Approx. Decimal	Length, Inches 6 to 3 3/4	3 1/2 to 2 1/4	2 to 1	7/8 to 3/4	5/8 to 1/2	7/16	3/8
7/16	.437	$.17	$.17	$.15	$.15 1/2	$.16	$.17	$.18
3/8	.375	.17	.17	.15	.15 1/2	.16	.17	.18
11/32	.344	.18 1/2	.17 1/2	.15 1/2	.16	.16 1/2	.17	.18
5/16	.312	.18 1/2	.17 1/2	.15 1/2	.16	.16 1/2	.18	.18
No. 1	.300	.19	.18	.16	.16 1/2	.17	.19	.19
9/32	.281	.19	.18	.16	.16 1/2	.17	.19	.19
No. 3	.259	.19	.18	.16	.16 1/2	.17	.19	.19
1/4	.250	.19	.18	.16	.16 1/2	.17	.19	.19
No. 4	.238	.22	.20	.17	.17 1/2	.18	.19	.20
7/32	.220	.22	.20	.17	.17 1/2	.18	.20	.20
No. 6	.203	.22	.20	.17	.17 1/2	.18	.20	.21
3/16	.187	.22	.20	.17	.17 1/2	.18	.20	.21
No. 7	.180	...	...	.17	.17 1/2	.19	.20	.21
5/32	.156	...	...	.18	.18 1/2	.19	.21	.22
No. 9	.148	...	...	.19	.19 1/2	.20	.22	.23
No. 10	.134	...	...	.20	.20 1/2	.21	.23	.25
1/8	.125	...	...	.21	.21 1/2	.22	.26	.29
No. 12	.109	...	...	.22	.22 1/2	.23	.28	.31
3/32	.094	...	...	.26	.26 1/2	.27	.32	.36
No. 14	.083	...	...	.28	.28 1/2	.29	.37	.42

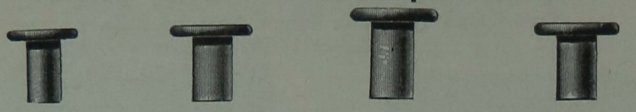
Diameter	Approx. Decimal	Length, Inches 11/32	5/16	9/32	1/4	7/32	3/16	5/32	1/8	3/32
7/16	.437	$.19	$.20	$.20	...	...	...	...	...	...
3/8	.375	.19	.20	.20	...	...	...	...	...	...
11/32	.344	.19	.20	.20	...	...	...	...	...	...
5/16	.312	.19	.20	.20	...	...	...	...	...	...
No. 1	.300	.19	.20	.20	...	...	...	...	...	...
9/32	.281	.19	.20	.20	$.20	$.21	...	...	...	...
No. 3	.259	.19	.20	.20	.20	.21	...	...	...	...
1/4	.250	.19	.20	.20	.20	.21	$.21	...	...	...
No. 4	.238	.20	.20	.20	.20	.21	.21	$.22	...	...
7/32	.220	.20	.21	.22	.22	.23	.23	.24	$.24	$.25
No. 6	.203	.21	.22	.22	.23	.24	.25	.25	.25	.26
3/16	.187	.21	.22	.22	.23	.24	.25	.26	.27	.28
No. 7	.180	.21	.22	.22	.23	.24	.25	.26	.27	.28
5/32	.156	.22	.23	.23	.24	.25	.26	.27	.28	.29
No. 9	.148	.23	.25	.25	.25	.26	.27	.29	.31	.32
No. 10	.134	.27	.29	.30	.30	.32	.35	.37	.39	.40
1/8	.125	.30	.32	.33	.33	.35	.39	.42	.44	.47
No. 12	.109	.32	.34	.36	.37	.38	.43	.47	.52	.57
3/32	.094	.37	.39	.41	.42	.43	.47	.52	.57	.62
No. 14	.083	.47	.52	.54	.57	.60	.60	.62	.65	.67

Intermediate lengths and diameters take list of nearest smaller size, except lengths longer than 2 inches take price of next longer length. Rivets made from smaller wire than No. 14 quoted on application. Standard heads are round, wagon box, truss, cone, flat, countersunk and pan heads. For special heads when ordered in quantities of less than 1000 pounds of a size at a time, add 2c to list. For special rivets, such as cupped end, finished headless, pointed, collared, swelled neck, square neck, single lug head, add 2c to list.

The following extras are a part of the rivet list: For 100-pound kegs, add 1 cent per pound to list. For 50-pound wooden boxes, add 3 cents per pound to list. For 25-pound wooden boxes, add 4 cents per pound to list. For 5 or 10-pound paper boxes add 5 cents per pound to list. For 1 pound paper boxes add 8 cents to list.

Extra for metallic tinning, etc., on application.

Black Tinners' and Coopers' Rivets



Size Weight Per 1000	Tinners' Per 1000 in Carton	Tinners' Per Lb. in. 200-Lb. Kegs	Coopers' *Per Lb. in 200-Lb. Kegs	Size Weight Per 1000	Tinners' Per 1000 in Carton	Tinners' Per Lb. in 200-Lb. Kegs	Coopers' *Per Lb. in 200-Lb. Kegs
6 Oz.	$.28	$.62	$.66	4 Lbs.	$1.20	$.22	$.26
8 Oz.	.32	.52	.56	5 Lbs.	1.30	.21	.25
10 Oz.	.36	.49	.53	6 Lbs.	1.50	.20	.24
12 Oz.	.41	.46	.50	7 Lbs.	1.75	.20	.24
14 Oz.	.45	.43	.47	8 Lbs.	2.00	.20	.24
1 Lbs.	.48	.40	.44	9 Lbs.	2.20	.19	.23
1¼ Lbs.	.54	.35	.39	10 Lbs.	2.40	.19	.23
1½ Lbs.	.62	.33	.37	12 Lbs.	2.64	.17	.21
1¾ Lbs.	.67	.30	.34	14 Lbs.	3.08	.17	.21
2 Lbs.	.72	.28	.32	16 Lbs.	3.52	.17	.21
2½ Lbs.	.83	.25	.29	18 Lbs.	3.78	.16	.20
3 Lbs.	.96	.24	.28	20 Lbs.	4.20	.16	.20
3½ Lbs.	1.09	.23	.27	....	....	...	...

*Flat countersunk head, pointed.

For 100-pound kegs, add 1 cent to list; 50-pound boxes, add 3 cents; 25-pound boxes, add 4 cents; 5 or 10-pound cartons, add 5 cents; 1-pound cartons, add 8 cents.

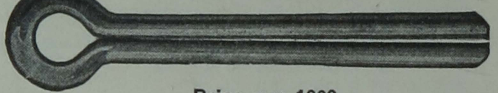
Metallic-tinned or tin-plating prices on application. When tinned rivets are ordered, metallic tinned are furnished.

Dimensions of Tinners' and Coopers' Rivets

Size Oz.	Length In.	Diam. In.	Size Lbs.	Length In.	Diam. In.	Size Lbs.	Length In.	Diam. In.
6	⅛	.083	2	17/64	.144	9	29/64	.238
8	5/32	.089	2½	19/64	.148	10	31/64	.238
10	3/16	.095	3	5/16	.161	12	½	.259
12	3/16	.104	3½	21/64	.165	14	31/64	.284
14	3/16	.109	4	11/32	.176	16	35/64	.300
16	7/32	.112	5	⅜	.188	18	19/32	.340
20	7/32	.120	6	25/64	.203	20	11/16	.375
24	¼	.130	7	13/32	.216	..	...	....
28	¼	.135	8	7/16	.225	..	...	....

Steel Spring Cotters

Beveled Points



Price per 1000

Lgth. In.	Diameter, Inches 1/16	3/32	⅛	5/32	3/16	¼	5/16	⅜	½	⅝
½	$.35	$.40	$.55	....	....	....	....	.....	.....	.....
¾	.45	.53	.75	$1.20	$1.70	....	....	.....	.....	.....
1	.55	.65	.90	1.45	2.05	$3.40	$5.30	.....	.....	.....
1¼	.65	.78	1.10	1.70	2.40	4.00	6.20	.....	.....	.....
1½	.75	.90	1.25	1.95	2.75	4.60	7.10	$10.50	.....	.....
1¾	.95	1.03	1.45	2.20	3.10	5.20	8.05	.....	.....	.....
2	1.05	1.15	1.60	2.45	3.45	5.80	9.00	13.00	$25.00	.....
2¼	....	....	....	2.70	3.80	6.40	9.90	.....	.....	.....
2½	....	1.55	2.00	2.95	4.15	7.00	10.80	15.50	30.00	.....
3	....	....	2.50	3.45	5.00	7.80	11.70	18.00	35.00	$57.50
3½	....	....	....	....	5.75	8.60	13.90	20.50	40.00	64.75
4	....	....	....	....	6.50	9.40	16.10	23.00	45.00	72.00
5	....	....	....	....	....	....	18.30	27.00	55.00	85.00
6	....	....	....	....	....	....	....	31.00	65.00	98.00

All measurements made under the eye.

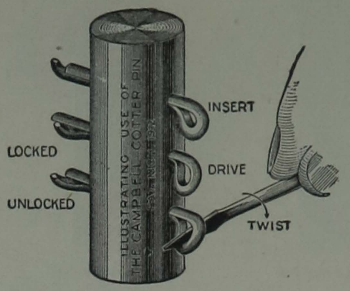
Number of Cotters in a Box

1/16 In. Diameter, All Lengths	1000
3/32 and ⅛ In. Diam., Lengths to 1½ Inches, Incl	1000
3/32 and ⅛ In. Diam., Lengths Longer Than 1½ Inches	500
5/32 and 3/16 In. Diam., Lengths to 1 Inch, Incl	1000
5/32 and 3/16 In. Diam., 1¼ and 1½-Inch Lengths	500
5/32 and 3/16 In. Diam., Longer Than 1¼ and 1½ In.	250
¼ Inch Diameter, Lengths to 3½ Inches, Inclusive	250
¼ Inch Diameter, Lengths Longer Than 3½ Inches	125
5/16 Inch Diameter, Lengths 1 to 1¼ Inches Inclusive	250
5/16 Inch Diameter, Lengths 1½ to 3 Inches, Inclusive	125
5/16 Inch Diameter, Lengths Longer Than 3 Inches	Bulk

Diameters, ⅜, 7/16, ½, ⅝ and ¾ inches, all lengths, packed in bulk.

Prices are for standard packages; extra for other than standard packing. Brass cotter list, 8 times steel list.

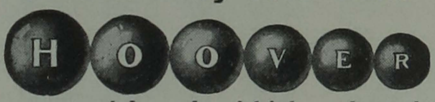
Campbell Hammerlock Self-Spreading Cotter Pins



For quick repairs on automobiles. All operations being done from eye end, pin may be easily locked in places where points are inaccessible to spread in the manner necessary with the old type. Inserts readily, as the ends are together and it has a perfect point. A slight blow on head drives the straight wire past the bent end of the other, thus locking it. May also be used as ordinary cotter pin.

Lgth. In.	Per 1000 — Diameter, Inches 1/16	3/32	7/64	⅛	5/32	3/16	¼	5/16	⅜
½	$.35	$.40	....	$.55	....	....	....	....	.....
¾	.45	.53	$.75	.75	$1.20	$1.70	....	....	.....
1	.55	.65	.90	.90	1.45	2.05	$3.40	$5.30	.....
1¼	.65	.78	1.10	1.10	1.70	2.40	4.00	6.20	.....
1½	.75	.90	1.25	1.25	1.95	2.75	4.60	7.10	$10.50
1¾	.95	1.03	....	1.45	2.20	3.10	5.20	8.05	.....
2	1.05	1.15	....	1.60	2.45	3.45	5.80	9.00	13.00
2¼	....	....	....	....	2.70	3.80	6.40	9.90	.....
2½	....	1.55	....	2.00	2.95	4.15	7.00	10.80	15.50
3	....	....	....	2.50	3.45	5.00	7.80	11.70	18.00
3½	....	....	....	....	....	5.75	8.60	13.90	20.50
4	....	....	....	....	....	6.50	9.40	16.10	23.00

Chrome Alloy Steel Balls

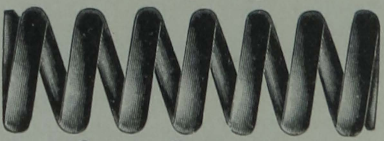


Made from a special grade of high carbon chrome alloy steel.

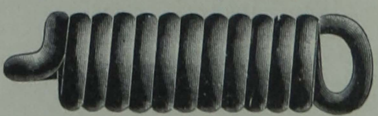
Price list covers four regular grades of steel balls, classified as follows: Grade 1, maximum variation per carton, plus or minus .000025 in.; Grade 2, maximum variation per carton, plus or minus .00005 in.; Grade 3, maximum variation per carton, plus or minus .0002 in.; Hardware Grade, maximum variation per carton, plus or minus .002 in.

Diam. In.	Per 1000	Diam. In.	Per 1000	Diam. In.	Per 1000	Diam. In.	Per 1000
1/16	$7.50	9/16	$55.00	1⅛	$440.00	2¼	$3400.00
3/32	6.50	19/32	63.00	1 3/16	530.00	2⅜	3900.00
⅛	4.00	⅝	72.00	1¼	630.00	2½	4500.00
5/32	4.50	21/32	81.00	1 5/16	740.00	2⅝	5900.00
3/16	5.00	11/16	95.00	1⅜	860.00	2¾	6800.00
7/32	6.00	23/32	120.00	1 7/16	980.00	2⅞	7100.00
¼	8.00	¾	135.00	1½	1100.00	3	7500.00
9/32	10.00	25/32	148.00	1 9/16	1250.00	3¼	8800.00
5/16	12.00	13/16	160.00	1⅝	1400.00	3½	10800.00
11/32	15.00	27/32	176.00	1 11/16	1550.00	3¾	13600.00
⅜	19.00	⅞	192.00	1¾	1700.00	4	18000.00
13/32	23.00	29/32	205.00	1 13/16	1850.00	4¼	22000.00
7/16	28.00	15/16	220.00	1⅞	2050.00	4½	28800.00
15/32	34.00	31/32	240.00	1 15/16	2250.00	...	....
½	40.00	1	270.00	2	2450.00	...	....
17/32	47.00	1 1/16	355.00	2⅛	2900.00	...	....

Coil Springs



Open or Compression



Closed or Extension

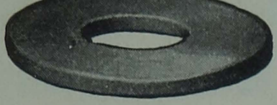
Made of oil tempered steel spring wire. Brass spring wire deteriorates with exposure to the atmosphere, and the coppered spring wire is uncertain as to quality.

Springs are made of wire that is approximately ⅛ of the outside diameter of the spring.

Prices upon application

Wrought Iron Washers

Adopted July 15, 1935



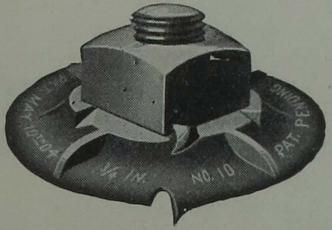
U. S. Standard Sizes

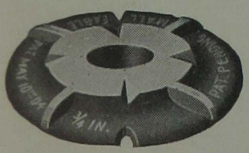
Size Bolt Inches	200-Lb. Kegs per 100 Lbs.	Outside Diam. Inches	Size Hole Inches	Thickness Wire Gauge No.	Approx. No. in 100 Pounds
3/16	$14.00	9/16	1/4	18	39,400
1/4	12.20	3/4	5/16	16	15,600
5/16	11.40	7/8	3/8	16	11,250
3/8	10.50	1	7/16	14	6800
7/16	9.80	1 1/4	1/2	14	4300
1/2	9.40	1 3/8	9/16	12	2600
9/16	9.30	1 1/2	5/8	12	2250
5/8	9.30	1 3/4	11/16	10	1300
3/4	9.20	2	13/16	9	900
7/8	9.20	2 1/4	15/16	8	782
1	9.20	2 1/2	1 1/16	8	568
1 1/8	9.20	2 3/4	1 1/4	8	473
1 1/4	9.20	3	1 3/8	8	364
1 3/8	9.20	3 1/4	1 1/2	7	275
1 1/2	9.20	3 1/2	1 5/8	7	256
1 5/8	9.50	3 3/4	1 3/4	7	220
1 3/4	9.50	4	1 7/8	7	197
1 7/8	9.50	4 1/4	2	7	174
2	9.50	4 1/2	2 1/8	7	160
2 1/4	10.50	4 3/4	2 3/8	5	121
2 1/2	10.50	5	2 5/8	4	106
2 3/4	11.50	5 1/4	2 7/8	3	91
3	12.50	5 1/2	3 1/8	2	77

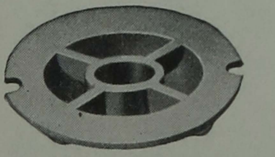
Net Extras

Add $.25 per package less than 200-pound kegs; $1.25 per hundred pounds for 5-pound paper boxes; $2.00 per hundred pounds for 1-pound paper boxes.

Malleable Iron Nut Lock Washers





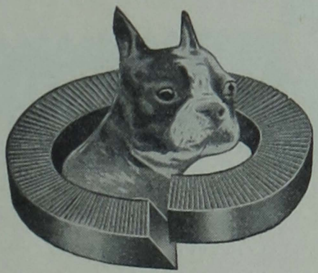


These washers are of malleable iron as a substitute for the common old style cast iron washers. The Western Pattern No. 10 is the engineers' standard west of the Alleghenies. The Eastern Pattern No. 44 is engineers' standard east of the Alleghenies.

	No. 10 Western Pattern				No. 44 Eastern Pattern			
			Comparative Wt. Lbs. per 100				Comparative Wt. Lbs. per 100	
Size Bolt Hole In.	Diam. In.	Thick-ness In.	Malleable Iron	Cast Iron	Diam. In.	Thick-ness In.	Malleable Iron	Cast Iron
3/8	2 1/2	1/4	18	..	2	3/16	9	....
1/2	2 1/2	1/4	19 1/2	45	2	1/4	12	21
5/8	2 3/4	5/16	25 1/2	66	2 1/2	5/16	21	43
3/4	3	7/16	33	100	3	3/8	30	70
7/8	3 1/2	7/16	54	150	3 1/2	3/8	46	113
1	4	1/2	73	200	4	7/16	57	175
1 1/8	4 1/2	1/2	106	262	4 1/2	1/2	90	256
1 1/4	5	5/8	129	450	5	9/16	125	332
1 3/8	5 1/2	9/16	155	....	5 1/2	9/16	145	455
1 1/2	6	3/4	182	575	6	5/8	182	610
1 3/4	6	3/4	225	618	7	3/4	310	865
2	7 1/2	3/4	415	1262	7 1/2	3/4	400	1115

Prices upon application.

Non-Entangling Never Slip Lock Washers



The Never Slip Lock Washer has all the expansive power of a plain washer, and in addition thereto the sharp and gripping teeth of metal projecting from both sides, which firmly imbed themselves into the metal with which they come in contact.

Each of these teeth is equal in holding or gripping power to the single barb on the ordinary lock washer.

The Never Slip Lock Washer gives 60 per cent greater gripping power.

Each washer is carefully heat treated, tested and inspected.

The standard package contains 1000.

For Fillister Head Machine Screws

	S.A.E. Standard		S.A.E. Special Light		S.A.E. Special Heavy	
Size	Section Inches	Per 1000	Section Inches	Per 1000	Section Inches	Per 1000
2	1/32x.022	$2.45	.022x.022	$2.45	1/32x1/32	$2.45
4	1/32x1/32	2.30	1/32x.022	2.30	3/64x1/32	2.30
6	3/64x1/32	2.15	1/32x1/32	2.10	3/64x3/64	2.15
8	3/64x3/64	1.95	3/64x1/32	1.95	1/16x3/64	1.95
10	1/16x3/64	1.75	3/64x3/64	1.75	1/16x1/16	1.75
12	1/16x1/16	1.95	1/16x3/64	1.95	5/64x1/16	2.00

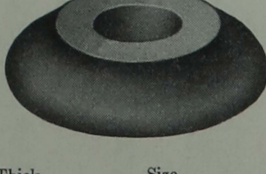
For Round Head Machine Screws

2	1/32x1/32	$2.45	1/32x.022	$2.45	3/64x1/32	$2.50
4	1/16x1/32	2.30	3/64x1/32	2.30	5/64x1/32	2.35
6	5/64x1/32	2.15	1/16x1/32	2.20	5/64x3/64	2.15
8	5/64x3/64	2.05	5/64x1/32	2.05	3/32x3/64	2.05
10	3/32x3/64	2.00	5/64x3/64	1.75	3/32x1/16	2.20
12	3/32x1/16	2.25	3/32x3/64	2.05	1/8x3/64	2.40

For S.A.E. Standard Bolts

1/4	3/32x1/16	$2.25	3/32x3/64	$2.10	3/32x5/64	$2.35
5/16	1/8x1/16	3.00	1/8x3/64	2.75	1/8x3/32	3.35
3/8	1/8x3/32	3.75	1/8x1/16	3.60	1/8x1/8	4.80
7/16	5/32x1/8	6.40	5/32x1/16	5.15	5/32x5/32	8.30
1/2	11/64x1/8	7.60	11/64x1/16	5.80	11/64x11/64	11.90
9/16	3/16x1/8	10.25	3/16x3/32	8.40	3/16x3/16	15.35
5/8	13/64x5/32	15.80	13/64x3/32	12.50	13/64x13/64	20.80
11/16	7/32x3/16	20.80	7/32x1/8	18.80	7/32x7/32	27.00
3/4	1/4x3/16	25.60	1/4x1/8	20.70	1/4x1/4	34.00
7/8	17/64x3/16	39.30	17/64x5/32	37.50	17/64x17/64	51.60
1	5/16x1/4	65.70	5/16x3/16	60.00	5/16x5/16	71.00
1 1/8	3/8x1/4	90.00	3/8x3/16	64.00	3/8x3/8	109.05
1 1/4	7/16x1/4	124.00	7/16x3/16	86.00	7/16x5/16	128.00
1 3/8	7/16x5/16	140.00	7/16x1/4	136.00	7/16x3/8	144.00
1 1/2	1/2x5/16	170.00	1/2x1/4	165.00	1/2x3/8	195.20

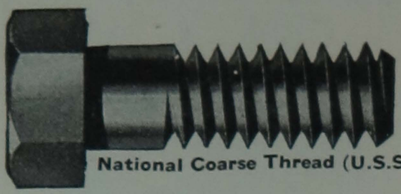
Cast Iron Washers



Size Bolt In.	O.D. In.	Size Hole In.	Thick-ness In.	Wt. Lbs.	Size Bolt In.	O.D. In.	Size Hole In.	Thick-ness In.	Wt. Lbs.
1/2	2 3/8	5/8	5/8	1/2	1	4 1/8	1 1/8	1 3/16	2 1/4
5/8	2 3/4	3/4	3/4	5/8	1 1/8	4 1/2	1 1/4	1 5/16	3
3/4	3	7/8	13/16	1 1/2	1 1/4	5	1 3/8	1 7/16	4
7/8	3 1/2	1	1 1/16	1 3/4	1 1/2	6	1 3/4	1 9/16	6

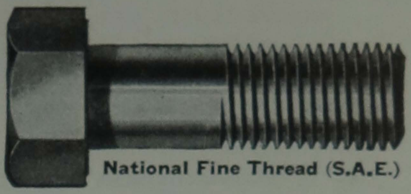
Price per 100 pounds upon application.

Hexagon Head Cap Screws



National Coarse Thread (U.S.S.)

Cold Forged and Milled from the Bar



National Fine Thread (S.A.E.)

Price, per 100

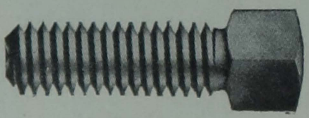
Diameter of Screw ....inches	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Diameter of Head ....inches	7/16	1/2	9/16	5/8	3/4	13/16	7/8	1	1 1/8	1 5/16
Height of Head ....inches	3/16	15/64	9/32	21/64	3/8	27/64	15/32	9/16	21/32	3/4
Threads Per Inch, National Coarse (U.S.S.)	20	18	16	14	13	12	11	10	9	8
Threads Per Inch, National Fine (S.A.E.)	28	24	24	20	20	18	18	16	14	14
Length under Head to Extreme Point, Inches — 1/2	$1.30	$1.50	$1.90	....	.....	.....	.....	.....	.....	.....
5/8	1.35	1.60	2.00	....	.....	.....	.....	.....	.....	.....
3/4	1.40	1.70	2.10	$3.00	$4.70	.....	.....	.....	.....	.....
7/8	1.50	1.80	2.20	3.10	4.90	.....	.....	.....	.....	.....
1	1.60	1.90	2.30	3.20	5.10	$7.90	$8.60	.....	.....	.....
1 1/4	1.80	2.10	2.50	3.50	5.50	8.40	9.20	$13.30	.....	.....
1 1/2	2.00	2.30	2.70	3.80	5.90	8.90	9.80	14.10	.....	.....
1 3/4	2.20	2.50	3.00	4.10	6.30	9.40	10.40	14.90	.....	.....
2	2.40	2.70	3.30	4.50	6.70	10.00	11.00	15.70	$24.60	$36.00
2 1/4	2.60	2.90	3.60	4.90	7.20	10.60	11.60	16.50	25.80	38.00
2 1/2	2.80	3.20	3.90	5.30	7.70	11.20	12.20	17.30	27.20	40.00
2 3/4	3.00	3.50	4.30	5.70	8.20	11.80	12.80	18.10	28.60	42.00
3	3.30	3.80	4.70	6.20	8.70	12.40	13.50	18.90	30.00	44.00
3 1/4	4.00	4.60	5.30	6.70	9.20	13.00	14.20	19.80	31.50	46.00
3 1/2	4.70	5.40	5.90	7.20	9.80	13.60	15.00	20.80	33.00	49.00
3 3/4	....	....	6.80	7.90	10.40	14.30	15.80	21.80	35.00	52.00
4	....	....	7.70	8.60	11.00	15.00	16.60	22.80	37.00	55.00
4 1/2	....	....	....	....	13.40	17.50	18.60	25.50	41.00	61.00
5	....	....	....	....	.....	.....	22.60	30.90	45.00	68.00
5 1/2	....	....	....	....	.....	.....	.....	.....	54.00	80.00
6	....	....	....	....	.....	.....	.....	.....	63.00	92.00
Add for Each 1/4 Inch	.70	.80	.90	1.00	1.20	1.50	2.00	2.70	4.50	6.00

Thread lengths: National Coarse (U.S.S.) thread screws threaded two times diameter of body plus 1/4 inch. National Fine (S.A.E.) thread screws threaded one and one-half times diameter of body plus 1/4 inch.

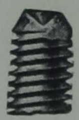
Give diameter first when ordering.

Case-Hardened Square Head Set Screws

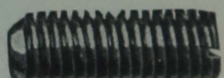
Effective February 1, 1924



Square Head



Cup Point



Headless

Per 100

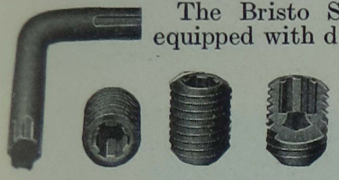
Diam Head..in.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Height Head.....in.	3/16	15/64	9/32	21/64	3/8	27/64	15/32	9/16	21/32	3/4
D. S.........in.	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
Threads to Inch	20	18	16	14	13	12	11	10	9	8
Length under Head to Extreme Point, Inches — 1/2	$2.80	$3.15	$3.65	.....	.....	.....	.....	.....	.....	.....
5/8	2.85	3.20	3.70	$5.35	$6.55	.....	.....	.....	.....	.....
3/4	2.90	3.25	3.75	5.45	6.65	$11.15	$11.55	.....	.....	.....
7/8	3.10	3.40	4.00	5.55	6.75	11.35	11.75	.....	.....	.....
1	3.25	3.55	4.30	5.65	6.85	11.55	11.95	$21.10	.....	.....
1 1/4	3.60	3.90	4.80	6.15	7.60	11.75	12.15	21.50	$35.70	.....
1 1/2	3.95	4.20	5.25	6.65	8.35	11.95	12.35	21.90	36.20	$47.50
1 3/4	4.25	4.70	5.90	7.25	9.10	12.90	13.30	22.30	36.70	48.10
2	4.55	5.20	6.55	7.90	9.80	13.80	14.20	22.70	37.20	48.70
2 1/4	4.80	5.65	7.15	8.65	10.60	14.85	15.30	24.40	39.80	51.50
2 1/2	5.10	6.15	7.75	9.45	11.40	16.00	16.50	26.10	42.30	53.35
2 3/4	5.35	6.60	8.40	10.15	12.15	17.15	17.65	27.80	44.80	57.20
3	5.65	7.10	9.00	10.90	12.35	18.25	18.85	29.35	47.40	59.85
3 1/4	....	....	....	11.70	14.15	19.75	20.40	31.30	50.00	63.25
3 1/2	....	....	....	12.45	15.35	21.20	21.90	33.20	52.80	66.65
3 3/4	....	....	....	13.25	16.60	22.70	23.30	35.20	55.60	69.75
4	....	....	....	14.00	17.85	24.20	24.85	37.10	58.25	73.20
4 1/4	....	....	....	....	....	.....	25.40	39.50	61.15	77.50
4 1/2	....	....	....	....	....	.....	27.95	41.85	63.85	82.15
4 3/4	....	....	....	....	....	.....	.....	44.35	66.70	86.40
5	....	....	....	....	....	.....	.....	.....	69.60	90.85

N. C. Standard threads will be furnished unless otherwise specified.

Cup point set screws, case-hardened, are regular. Points of other shapes are special and made to order. Prices based on quantity. Cup points furnished unless otherwise specified.

Headless set screws take same list as regular, measurements being taken over all.

Bristo Socket Safety Set Screws



The Bristo Socket Safety Set Screw is equipped with dove-tailed slots or flutes into which the corresponding dove-tailed projections of the wrench fit. When these set screws are being set up by means of this wrench there is no tendency to expand or split the screw, even if great pressure is applied to the handle of the wrench, but instead there is a tendency for the wrench to contract the screw on account of the angles at which the faces of the dove-tailed flutes and slots bear against each other.

Have clean-cut threads of exact measurement, and are especially heat treated.

Four wrenches free with each 100 screws.

All sizes listed below are standard in American Standard Coarse (U.S.S.) Thread Series in cup point.

*Items on the hollow cup point coarse thread list are standard in the following: Fine thread series (S.A.E.), cup point. Coarse thread series (U.S.S.), oval point. Coarse thread series (U.S.S.), flat-point. Coarse thread series (U.S.S.), half dog point. Coarse thread series (U.S.S.), cone point.

Can be furnished with Dardelet self-locking thread.

Price per 100

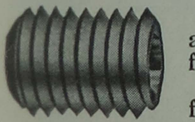
	Diam. Screw...in.	No. 5†	No. 6†	No. 8†	No. 10†	No. 12†	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
	N.C.S......per in.	40	32	32	24	24	20	18	16	14	13	11	10	9	8
	N.F.S......per in.	44	40	36	32	28	28	24	24	20	20	18	16	14	14
LENGTH OVER ALL, INCHES	1/8	$4.00	$4.10	$4.20	....	....	....	....	....	....	....	....	....	....	....
	3/16	*4.10	*4.20	*4.30	*$4.70	*$4.70	*$4.75	....	....	....	....	....	....	....	....
	1/4	*4.20	*4.30	*4.40	*4.75	*4.75	*4.80	*$4.85	*$4.90	....	....	....	....	....	....
	5/16	*4.30	*4.40	*4.50	*4.80	*4.80	*4.85	*4.90	*4.95	$5.80	....	....	....	....	....
	3/8	*4.40	*4.50	*4.60	*4.85	*4.85	*4.90	*4.95	*5.00	*5.90	*$6.80	....	....	....	....
	7/16	*4.50	*4.60	*4.70	*4.90	*4.90	*4.95	*5.00	*5.23	*6.00	*6.90	$9.70	....	....	....
	1/2	*4.60	*4.70	*4.80	*4.95	*4.95	*5.00	*5.20	*5.45	*6.25	*7.00	*9.80	$11.70	....	....
	9/16	4.70	4.80	4.90	5.00	5.00	5.18	5.40	5.68	6.50	7.30	9.90	11.80	....	....
	5/8	*4.80	*4.90	*5.00	*5.15	*5.15	*5.35	*5.60	*5.90	*6.75	*7.60	*10.00	11.90	....	....
	3/4	*4.90	*5.00	*5.35	*5.45	*5.45	*5.70	*6.00	*6.35	*7.25	*8.20	*10.70	12.00	$14.90	$19.80
	7/8	5.00	5.55	5.65	5.75	5.75	6.05	6.40	6.80	7.75	8.80	11.40	12.90	15.00	19.90
	1	*5.75	*5.85	*5.95	*6.05	*6.05	*6.40	*6.80	*7.25	8.25	*9.40	*12.10	13.80	16.10	20.00
	1 1/4	6.35	6.45	6.55	6.65	6.65	7.10	7.60	*8.15	9.25	*10.60	13.50	15.60	18.30	22.80
	1 1/2	....	....	....	....	....	7.80	8.40	*9.05	10.25	*11.80	*14.90	17.40	20.50	25.60
	1 3/4	....	....	....	....	....	8.50	9.20	9.95	11.25	13.00	16.30	19.20	22.70	28.40
	2	....	....	....	....	....	9.20	10.00	10.85	12.25	14.20	17.70	21.00	24.90	31.20
	2 1/4	....	....	....	....	....	....	....	12.65	14.25	15.40	19.10	22.80	27.10	34.00
	2 1/2	....	....	....	....	....	....	....	14.45	16.25	16.60	20.50	24.60	29.30	36.80
	2 3/4	....	....	....	....	....	....	....	....	....	17.80	21.90	26.40	31.50	39.60
	3	....	....	....	....	....	....	....	....	....	19.00	23.30	28.20	33.70	42.40
	Add for Each 1/4-In. Lgth. Not Listed	1.20	1.20	1.20	1.20	1.20	1.40	1.60	1.80	2.00	2.40	2.80	3.60	4.40	5.60
	Extra Wrenches.......each	.03	.03	.03	.03	.03	.03	.04	.05	.06	.07	.10	.15	.25	.35

†Machine screw sizes. Screws other than those listed above, prices upon application.

Socket Set Screws

Alloy Steel—Heat Treated

Effective June 1, 1935



These screws are milled from special alloy steel bars and properly heat-treated for maximum strength.

One short-armed wrench is furnished free with each 25 screws.

When ordering, give diameter first.

All sizes listed below are standard in National Coarse (U.S.S.) Thread Series in cup point.

*Items on the hollow cup point coarse thread list below are standard in the following:

Fine thread series (S.A.E.), cup point.
Coarse thread series (U.S.S.), oval point.
Coarse thread series (U.S.S.), flat point.
Coarse thread series (U.S.S.), half dog point.
Coarse thread series (U.S.S.), cone point.

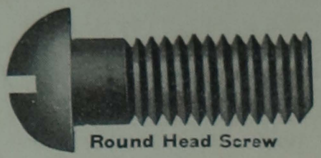
Per 100

	Diam. Screw...................in.	No. 10	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
	National Coarse Thrds..per inch	24	20	18	16	14	13	11	10	9	8
	National Fine Thrds.....per inch	32	28	24	24	20	20	18	16	14	14
	Size Hex. Hole...............in.	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	1/2	9/16
Length Over All, Inches	3/16	$*4.70	$*4.75	....	....	....	....	....	....	....	....
	1/4	*4.75	*4.80	$*4.85	$*4.90	....	....	....	....	....	....
	5/16	*4.80	*4.85	*4.90	*4.95	$ 5.80	....	....	....	....	....
	3/8	*4.85	*4.90	*4.95	*5.00	*5.90	$*6.80	....	....	....	....
	7/16	*4.90	*4.95	*5.00	*5.23	*6.00	*6.90	$ 9.70	....	....	....
	1/2	*4.95	*5.00	*5.20	*5.45	*6.25	*7.00	*9.80	$11.70	....	....
	9/16	5.00	5.18	5.40	5.68	6.50	7.30	9.90	11.80	....	....
	5/8	*5.15	*5.35	*5.60	*5.90	*6.75	*7.60	*10.00	11.90	....	....
	3/4	*5.45	*5.70	*6.00	*6.35	*7.25	*8.20	*10.70	12.00	$14.90	$19.80
	7/8	5.75	6.05	6.40	6.80	7.75	8.80	11.40	12.90	15.00	19.90
	1	*6.05	*6.40	*6.80	*7.25	8.25	*9.40	*12.10	13.80	16.10	20.00
	1 1/4	6.65	7.10	7.60	*8.15	9.25	*10.60	*13.50	15.60	18.30	22.80
	1 1/2	....	7.80	8.40	*9.05	10.25	*11.80	*14.90	17.40	20.50	25.60
	1 3/4	....	8.50	9.20	9.95	11.25	13.00	16.30	19.20	22.70	28.40
	2	....	9.20	10.00	10.85	12.25	14.20	17.70	21.00	24.90	31.20
	2 1/4	....	....	....	12.65	14.25	15.40	19.10	22.80	27.10	34.00
	2 1/2	....	....	....	14.45	16.25	16.60	20.50	24.60	29.30	36.80
	2 3/4	....	....	....	....	....	17.80	21.90	26.40	31.50	39.60
	3	....	....	....	....	....	19.00	23.30	28.20	33.70	42.40
	Add for Each 1/4" Lgth. Not Listed	1.20	1.40	1.60	1.80	2.00	2.40	2.80	3.60	4.40	5.60
	Extra Wrenches:										
	Short Arm..............each	.03	.03	.04	.05	.06	.07	.10	.15	.25	.35
	Long Arm...............each	.04	.04	.05	.06	.07	.08	.12	.20	.35	.50

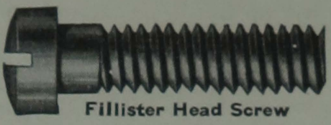
Machine Screws

Iron or Brass
Flat, Round and Fillister Heads

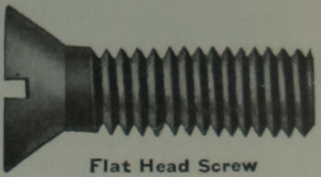
Revised April 2, 1928



Round Head Screw



Fillister Head Screw



Flat Head Screw

Packed 1 gross in a carton.

Price, per Gross

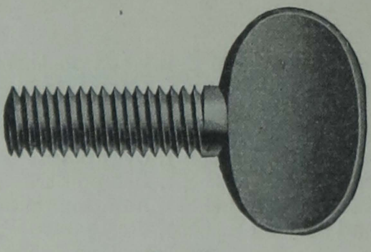
*Threads	56		48		40		32		32		24		24		20		18		16	
per Inch	64		56		48		40		36		32		28		28		24		24	
Diameter	No. 2		No. 3		No. 4		No. 6		No. 8		No. 10		No. 12		¼		5/16		⅜	
Length Inches	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass	Iron	Brass
⅛	$.24	$.28	$.25	$.34	$.26	$.40	$.28	$.52	....	....	....	....	....	....	....	....	....	.....	....	.....
3/16	.25	.30	.26	.36	.27	.42	.29	.54	$.35	$.70	$.45	$.95	....	....	....	....	....	.....	....	.....
¼	.26	.32	.27	.38	.28	.44	.30	.58	.36	.76	.46	1.05	$.64	$1.60	....	....	....	.....	....	.....
5/16	.27	.34	.28	.40	.29	.46	.31	.62	.37	.82	.48	1.15	.66	1.70	$.80	$2.30	....	.....	....	.....
⅜	.28	.36	.29	.42	.30	.48	.32	.66	.39	.88	.50	1.25	.68	1.80	.84	2.40	$1.55	$4.60	....	.....
7/16	.29	.38	.30	.44	.31	.50	.34	.70	.41	.94	.52	1.35	.70	1.90	.88	2.50	1.60	4.80	....	.....
½	.30	.40	.31	.46	.32	.54	.36	.76	.43	1.02	.54	1.45	.74	2.00	.92	2.65	1.65	5.00	$2.20	$7.10
⅝	.32	.44	.33	.52	.34	.62	.40	.92	.47	1.20	.58	1.75	.82	2.20	1.00	2.95	1.75	5.40	2.40	7.70
¾	.33	.50	.34	.58	.36	.68	.43	1.00	.49	1.30	.62	1.90	.86	2.40	1.05	3.15	1.80	5.80	2.50	8.20
⅞	.34	.56	.36	.66	.38	.74	.46	1.10	.53	1.45	.66	2.05	.92	2.60	1.10	3.45	1.90	6.30	2.65	8.90
1	...	...	...	...	.42	.82	.50	1.20	.57	1.60	.70	2.20	.98	2.80	1.20	3.75	2.00	6.80	2.85	9.60
1⅛	...	...	...	...	.46	.90	.54	1.30	.63	1.75	.76	2.35	1.04	3.00	1.30	4.05	2.10	7.30	3.05	10.30
1¼	...	...	...	...	.52	1.00	.58	1.45	.69	1.90	.82	2.55	1.10	3.25	1.40	4.35	2.25	7.80	3.25	11.00
1½	...	...	...	...	.60	1.25	.68	1.65	.82	2.15	.95	2.90	1.24	3.75	1.60	4.95	2.45	8.50	3.55	12.10
1¾	...	...	...	...	...	...	.82	1.95	.95	2.45	1.12	3.35	1.40	4.25	1.80	5.55	2.75	9.30	3.95	13.40
2	...	...	...	...	...	...	.96	2.25	1.08	2.75	1.30	3.80	1.60	4.75	2.00	6.15	3.05	10.40	4.40	14.70
2¼	...	...	...	...	...	....	...	....	1.25	3.10	1.50	4.25	1.80	5.25	2.25	6.75	3.35	11.50	4.85	16.20
2½	...	...	...	...	...	....	...	....	1.45	3.45	1.70	4.75	2.05	5.75	2.50	7.35	3.65	12.60	5.40	17.80
2¾	...	...	...	...	...	....	...	....	1.65	3.80	1.95	5.25	2.30	6.25	2.75	8.00	4.00	13.70	6.00	19.50
3	...	...	...	...	...	....	...	....	1.85	4.15	2.15	5.75	2.60	6.75	3.10	8.65	4.40	14.90	6.60	21.60

*Standard coarse and standard fine pitches, as recommended by National Screw Thread Commission.

Screws up to and including 1 inch long, threaded to head; over 1 inch, threaded three quarters of length.

Machine screws are furnished to A.S.S T. dimensions unless otherwise specified.

Malleable Iron Thumb Screws

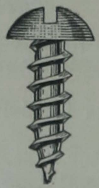


Per 100

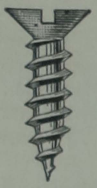
Length Under Head In.	Diam. and N. C. Threads Per Inch 3/16 24	 ¼ 20	 5/16 18	 ⅜ 16	 7/16 14	 ½ 13 or 12	 ¾ 10
½	$1.20	$1.50	$2.00	$2.70	.....	.....	.....
⅝	1.45	1.80	2.35	3.00	.....	.....	.....
¾	1.45	1.80	2.35	3.00	.....	.....	.....
1	1.70	2.10	2.70	3.40	$4.60	$5.80	$9.00
1¼	1.95	2.40	3.05	3.80	5.20	6.50	10.00
1½	2.20	2.70	3.40	4.20	5.80	7.20	11.00
2	2.80	3.30	4.10	5.00	7.00	8.60	13.00
2½	....	4.30	5.20	6.20	8.60	10.40	15.50
3	....	5.30	6.30	7.40	10.20	12.20	18.00

We are prepared to take care of your requirements for Special Nuts, Bolts, Screws, etc., in Everdur, Monel, Stainless Steel and other special compositions.

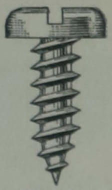
Continental Holtite Hardened Plain Steel Thread-Forming Screws



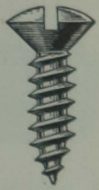
Round Head



Countersunk Flat Head



Binding Head



Countersunk Oval Head

Designed for joining two or more sheets of light gage sheet metal and for making fastenings to sheet metal, cutting their own thread as they are turned in with a screw driver.

Furnished with round, binding, flat countersunk and oval countersunk heads. Special sizes and types on order.

Stock finishes include plain, nickel plated, brass, copper, cadmium, electro-galvanized and parkerized.

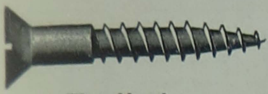
Special finishes, such as bronze, blue oxidized, black raven, chromium, etc., prices upon application.

Packed in cardboard containers containing one gross or 1000 of a size and kind. Larger quantities can be furnished in bulk.

Length Inches	No. 4 per Gross	No. 6 per Gross	No. 7 per Gross	No. 8 per Gross	No. 10 per Gross	No. 12 per Gross	No. 14 per Gross
¼	*$.35	*$.38	...	...	....	....	....
⅜	.38	.41	$.44	$.48	$.57	....	....
½	.41	.44	.48	.52	.62	*$.74	*$.84
⅝	.44	.48	.52	.56	.67	.80	.92
¾	.46	.51	.56	.61	.72	.87	1.01
⅞	...	.55	.61	.66	.77	.94	1.10
1	...	.59	.65	.71	.82	1.01	1.18
1¼	...	...	...	.81	** .93	**1.15	**1.36
1½	...	...	...	.91	**1.04	**1.30	**1.53
1¾	...	...	...	...	**1.16	**1.46	**1.72
2	...	...	...	...	**1.28	**1.62	**1.90

*Round head and binding head only.
**Round head, flat head and oval head only.

Steel and Brass Wood Screws



Flat Head

Round Head

Price, per Gross

Prices Effective November 20, 1935

No.	Steel	Brass
	¼-Inch	
0	$.30	$.64
1	.30	.66
2	.30	.70
3	.32	.76
4	.32	.86
	⅜-Inch	
0	$.32	$.66
1	.32	.70
2	.32	.76
3	.34	.82
4	.34	.90
5	.34	.98
6	.38	1.10
7	.42	....
8	.46	....
	½-Inch	
1	$.34	$.78
2	.34	.84
3	.36	.90
4	.36	.98
5	.36	1.10
6	.40	1.25
7	.44	1.45
8	.48	1.65
9	.52	....
10	.56	....
	⅝-Inch	
2	$.36	$.90
3	.38	1.00
4	.38	1.10
5	.40	1.25
6	.44	1.40
7	.48	1.60
8	.52	1.80
9	.56	2.05
10	.60	2.30
11	.64	....
12	.68	....
	¾-Inch	
2	$.38	$1.00
3	.40	1.10
4	.40	1.20
5	.42	1.35
6	.46	1.50
7	.50	1.75
8	.54	2.00
9	.58	2.25
10	.62	2.50
11	.66	2.75
12	.70	3.10
14	.90	....
	⅞-Inch	
3	$.44	....
4	.46	$1.40
5	.48	1.55
6	.52	1.75
7	.56	2.00
8	.60	2.25
9	.64	2.50
10	.68	2.75
11	.72	3.10
12	.76	3.45
14	1.05	....
	1-Inch	
3	$.46	....
4	.48	$1.50
	1-Inch—Cont.	
5	$.50	$1.65
6	.54	1.85
7	.58	2.15
8	.62	2.40
9	.66	2.70
10	.70	3.00
11	.75	3.35
12	.80	3.80
14	1.10	4.90
16	1.40	.....
	1¼-Inch	
4	$.52	.....
5	.54	.....
6	.58	$2.20
7	.62	2.50
8	.66	2.80
9	.70	3.20
10	.76	3.60
11	.84	4.00
12	.92	4.45
14	1.25	5.75
16	1.55	.....
18	1.85	.....
	1½-Inch	
4	$.60	.....
5	.62	.....
6	.66	$2.45
7	.70	2.80
8	.75	3.20
9	.80	3.60
10	.86	4.00
11	.95	4.55
12	1.05	5.10
14	1.35	6.50
16	1.70	.....
18	2.05	.....
20	2.40	.....
	1¾-Inch	
6	$.72	.....
7	.78	.....
8	.84	$3.65
9	.90	4.10
10	.96	4.60
11	1.05	5.20
12	1.15	5.85
14	1.50	7.40
16	1.90	.....
18	2.30	.....
20	2.70	.....
	2-Inch	
6	$.78	.....
7	.84	.....
8	.90	$4.00
9	1.00	4.50
10	1.10	5.10
11	1.20	5.75
12	1.30	6.55
14	1.60	8.15
16	2.00	10.30
18	2.40	12.45
20	2.80	.....
	2¼-Inch	
6	$.82	.....
7	.88	.....
8	.95	.....
9	1.05	.....
10	1.15	$5.60
	2¼-Inch—Cont.	
11	$1.25	$6.35
12	1.35	7.15
14	1.75	9.00
16	2.20	11.35
18	2.65	13.60
20	3.10	.....
	2½-Inch	
6	$.90	.....
7	.96	.....
8	1.05	.....
9	1.15	.....
10	1.25	$6.20
11	1.35	7.00
12	1.50	7.80
14	1.85	9.85
16	2.40	12.50
18	3.00	15.10
20	3.60	.....
	2¾-Inch	
8	$1.10	.....
9	1.20	.....
10	1.32	.....
11	1.45	.....
12	1.65	.....
14	2.05	.....
16	2.60	.....
18	3.20	.....
20	3.80	.....
	3-Inch	
8	$1.20	.....
9	1.30	.....
10	1.42	.....
11	1.55	.....
12	1.75	$9.15
14	2.25	11.20
16	2.80	14.40
18	3.40	17.65
20	4.00	.....
24	4.95	.....
	3½-Inch	
10	$1.90	.....
11	2.10	.....
12	2 30	$11.20
14	2 80	13.25
16	3.35	16 65
18	3.95	20.20
20	4.55	.....
24	5.70	.....
	4-Inch	
12	$2.50	....
14	3.00	.....
16	3.55	.....
18	4.20	.....
20	4.95	.....
24	6.60	.....
	4½-Inch	
14	$3.30	.....
16	3.85	.....
18	4.50	.....
20	5.25	.....
24	7.10	.....
	5-Inch	
14	$3.65	.....
16	4.20	.....
18	5.00	.....
20	6.00	.....
24	7.60	.....

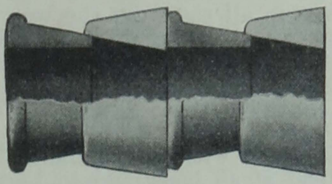
Lengths and diameters not listed are special. Such non-listed lengths and diameters take the list prices of the next longer or larger listed sizes.

The following varieties of screws can be furnished from this list at varying discounts: Flat, round, oval and fillister head. Steel can be furnished bright, blued, Japanned, coppered, tinned, sherardized and galvanized. Brass can be furnished nickel and silver plated; bronzed and lacquered.

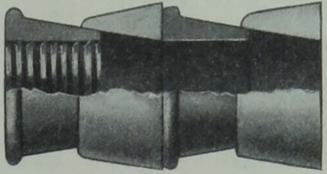
Cinch Anchors

2-Unit System

A 2-unit anchorage consists of 4 pieces, 2 irons and 2 lead alloys, without bolts; 1 unit plain and 1 unit threaded, or both units plain. The 2 units should be used for anchorage of ordinary strength.



Plain



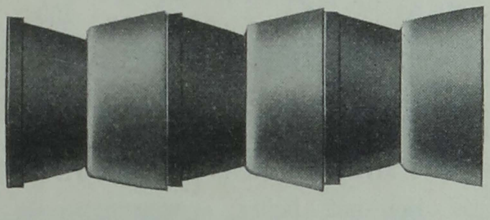
Threaded

Diam. Bolts Inches	Per 100 Sets	Min. Depth Holes Inches	Diam. Hole and Drill Required Inches
3/16	$7.00	⅞	½
¼	8.00	1 1/16	⅝
5/16	9.00	1 1/16	⅝
⅜	11.00	1½	13/16
½	18.00	1¾	1
⅝	24.00	1⅞	1 ⅛
¾	35.00	2½	1 ⅜
⅞	44.00	2¾	1 ½
1	63.00	3¼	1 ⅝
1⅛	140.00	4½	2
1¼	150.00	4¾	2 ⅛
1½	220.00	5¼	2 ⅜
1¾	320.00	8	3 ½

If no 13/16-inch drill is available, a ¾-inch drill can be used.

Cinch Anchors

3-Unit Systems



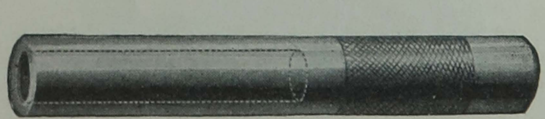
The three-unit anchorage consists of six pieces, three irons and three lead alloys, without bolts; two units plain and one unit threaded, or all three units plain.

Diam. Bolt In.	Per 100 Sets	Min. Depth Holes In.	Diam. Hole and Drill Required Inches	Diam. Bolt In.	Per 100 Sets	Min. Depth Holes In.	Diam. Hole and Drill Required Inches
3/16	$10.50	1⅛	½	⅞	$66.00	4	1½
¼	12.00	1⅝	⅝	1	94.50	4⅞	1⅝
5/16	13.50	1⅝	⅝	1⅛	210.00	6	2
⅜	16.50	2¼	13/16	1¼	225.00	6¼	2⅛
½	27.00	2⅝	1	1½	330.00	7¼	2⅜
⅝	36.00	2⅞	1⅛	1¾	480.00	12	3½
¾	52.50	3¾	1⅜	...	......	....	...

If no 13/16-inch drill is available, a ¾-inch drill can be used.

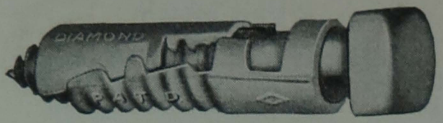
Cinch Brand Calking Tools

For Expanding Cinch Units



Diameter of Bolt Inches	Price Each	Diameter of Bolt Inches	Price Each
3/16	$.40	½	$.85
¼	.50	⅝	1.50
5/16	.50	¾	1.80
⅜	.60	⅞	2.10
7/16	.60	1	3.40

Diamond Lag Screw Expansion Shields



When the hole is drilled the same as for an old style shield, this new shield is driven in all the way, the work to be fastened is placed in position and the lag screw turned in. The lag screw turns in freely until the head is tight up against the work. Then a few hard turns on the wrench draw one side forward over an inclined bearing causing it to expand with a powerful wedge action.

This produces a parallel expansion with full cylindrical contact from end to end instead of an inner end contact only.

Made of high grade malleable iron, galvanized by the hot dip process which insures highest resistance against rust. It is composed of two halves: one side threaded to fit all standard lag screws, and one side unthreaded.

Long Standard Shields

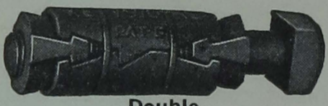
Diameter of Lag Screw with which Shield is Used In.	*Per 100	Length Shield In.	Outside Diameter and Drill Required In.	Std. Pkg.	Shipping Wt. Lbs. per 100
¼	$15.00	1½	½	100	4½
5/16	18.00	1¾	½	100	5
⅜	25.00	2¼	⅝	100	10
½	38.00	3	¾	100	16
⅝	45.00	3½	⅞	100	21
¾	65.00	3½	1	50	24

Short Standard Shields

Diameter of Lag Screw with which Shield is Used In.	*Per 100	Length Shield In.	Outside Diameter and Drill Required In.	Std. Pkg.	Shipping Wt. Lbs. per 100
¼	$15.00	1	½	100	3
5/16	18.00	1¼	½	100	3
⅜	25.00	1¾	⅝	100	7½
½	38.00	2	¾	100	10
⅝	45.00	2½	⅞	100	15

*Without lag screws.

Keystone Interlocking Expansion Shields



Double

Prevents the nut being drawn out of the shield when heavy loads are applied. Guides the mechanic in determining when to stop tightening up the bolt. Prevents the nut being drawn past the point of maximum expansion. Locks the two sides and the nut into a unit of resistance against the load.

Made of malleable iron for durability and strength.

Diam. Screw or Bolt Inches	Shields Only per 100	Length Shield Inches	O. D. and Size Drill to Use Inches	Diam. Screw or Bolt Inches	Shields Only per 100	Length Shield Inches	O. D. and Size Drill to Use Inches
¼	$15.00	1½	½	¾	$65.00	3¼	1⅛
5/16	18.00	1¾	9/16	⅞	95.00	4	1½
⅜	25.00	2	11/16	1	110.00	4¼	1⅝
7/16	32.00	2½	⅞	1¼	250.00	6	2⅛
½	38.00	2½	⅞	1½	350.00	7½	2½
⅝	45.00	2⅞	1	...	......	...	...

Di-En-Key Expansion Bolts
With Malleable Iron Expansion Shields

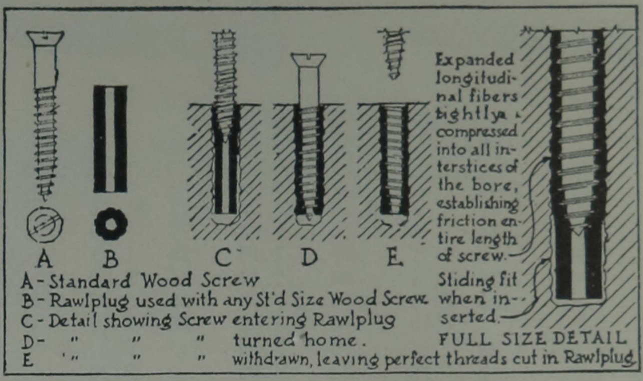
PAT'D
DI-EN
KEY

For use in suspension rods for mine hangers, steam and water pipes, sprinkler systems and allied lines. The smaller sizes are adapted to opera chairs and school furniture work.

Prices do not include machine bolt.

Diam. Screw Inches	Per 100	Length Inches	Outside Diam. Inches	Diam. Screw Inches	Per 100	Length Inches	Outside Diam. Inches
¼	$15.00	1	7/16	½	$38.00	2½	⅞
5/16	18.00	1¾	9/16	⅝	45.00	2½	1
⅜	25.00	2	11/16	¾	65.00	3¾	1¼
7/16	32.00	2½	⅞	..	.....	...	...

Rawlplug Fibre Screw Anchors


A
B
C
D
E
A - Standard Wood Screw
B - Rawlplug used with any St'd Size Wood Screw
C - Detail showing Screw entering Rawlplug
D - " " " turned home.
E " " " withdrawn, leaving perfect threads cut in Rawlplug
Expanded longitudinal fibers tightly compressed into all interstices of the bore, establishing friction entire length of screw.
Sliding fit when inserted.
FULL SIZE DETAIL

Application of Rawlplug with Standard Wood Screw

The Rawlplug is a hollow tube of stiffened longitudinal strands of jute fiber, so cemented that once in place it is unaffected by moisture or change of temperature. It is placed in a previously drilled hole smaller than the head of the screw and therefore invisible when in position. As the screw is turned home in the plug, the jute fiber strands expand and enter the interstices of the material, obtaining a strong, permanent grip. The screw cuts a perfect thread in the Rawlplug which permits withdrawing and reinserting the screw at any time in the orthodox manner.

The Rawlplug develops the full strength of the screw or the material. The screw will pull in two or the material will fail before the Rawlplug will come out.

It resists and absorbs vibrations and shocks due to the unusual composition of the plug. There is never a tendency, therefore, to work loose from these causes.

All prices are for 100 Rawlplugs.

Rawlplugs Only—In Boxes of 100

Rawlplug No.	Use with Screw No.	Diam. Drill Req'd In.	Use Rawldrill No.	Per 100 — Length of Rawlplug, Inches ⅝	¾	1	1¼	1½	2
6	5–6	5/32	6	....	$1.25	$1.30	$1.45	....	....
8	7–8	11/64	8	....	1.50	1.60	1.80	....	$2.20
10	9–10	3/16	10	....	....	1.80	2.05	$2.30	2.55
12	11–12	¼	12	....	....	2.20	2.45	2.70	2.95
14	14	9/32	14	....	....	....	2.90	3.20	3.50

Rawlplugs Only—In Boxes of 50

Rawlplug No.	Use with Screw No.	Diam. Drill Req'd In.	Use Rawldrill No.	⅝	¾	1	1¼	1½	2
16	16	5/16	16	....	....	....	$3.30	....	$4.10
20	18–20	⅜	20	....	....	....	4.90	....	5.90

For ¼-inch lag screw, use No. 14 or No. 16 Rawlplug.

For 5/16-inch lag screw, use No. 20 Rawlplug.

Standard package, 1 dozen boxes of same size and length.

Rawldrills and Holders
Corresponding to Size of Rawlplug

No. 14 holder takes Nos. 6, 8, 10, 12 and 14 Rawldrills.

No. 20 holder takes Nos. 16, 20 and 7/16″ Rawldrills.

Size Drill No.	Per Dozen 3-Pt. Drill	Per Dozen Holder and Ejector	Size Drill No.	Per Dozen 3-Pt. Drill	Per Dozen Holder and Ejector	Size Drill No.	Per Dozen 3-Pt. Drill	Per Dozen Holder and Ejector
6	$6.00	$9.00	10	$6.00	$9.00	16	$7.20	$12.00
8	6.00		12	6.00		20	8.40	
•	....	....	14	6.60		7/16″	10.80	

Extra drill ejectors, $1.20 per dozen.

Standard package, 1 dozen drills or holders of same size.

Rawlplug Contractors' Outfits

Made up especially for electrical and plumbing contractors, containing 450 of the sizes of Rawlplugs most popular with these trades (Nos. 8, 10, 12, 14, ¾ and ½). It also includes 14 of the corresponding sizes of Rawldrills, 2 holders, drift pins, Rawlplug and screw gage, and No. 20 Rawlgrip. (List price of contents, $24.36.)

Packed in heavy gauge steel mechanic's tool box.

Complete Rawlplug Outfit....................each $20.00

Rawlplug Household Outfits

A neat tin box containing No. 8 Rawlplugs, nickel-plated screws, screw eyes, screw hooks, and special Rawldrill and toolholder. Packed 12 in attractive counter display cartons.

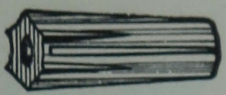
Household Outfits..............................each $.50

Rawlplugs for Lag Screws

Rawlplugs are made for ⅜, 7/16, ½ and ⅝-inch lag screws in all lengths.

Cinch Lead Screw Anchors

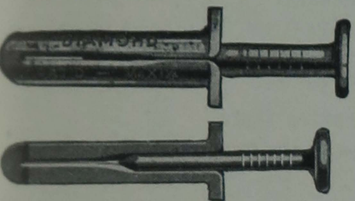
For Wood Screws



These are standard lead composition crew anchors for use with wood screws. The screw cuts its own thread.

Size Anchor Inches	Screw	Lgth. of Shield Inches	Outside Diameter Inches	Price per 100
/8 x 3/4	Nos. 5-6-7	3/4	1/4	$4.40
/16x 3/4	" 8-9-10-11	3/4	5/16	5.00
/16x1	" 9-10-11 Light	1	5/16	5.00
/16x1	" 9-10-11 Heavy	1	3/8	6.00
/16x1 5/8	" 9-10-11	1 5/8	5/16	6.25
/4 x1	" 12-13-14	1	3/8	5.60
/4 x1 1/2	" 12-13-14	1 1/2	3/8	8.00
/16x1	" 15-16-17-18	1	7/16	6.25
/16x1 1/2	" 15-16-17-18	1 1/2	7/16	10.00
/8 x2	" 20-22-24	2	9/16	15.00

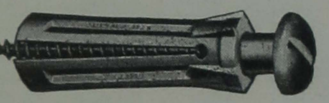
Diamond DHD Hammer Drive Anchors



For nailing to concrete, brick or stone. Shields are non-rusting, of aluminum alloy; made of 1 piece of metal, a single unit which cannot become disarranged. Furnished with heavily galvanized nails.

Diam. and Lgth. of Shield In.	Diam. Drill to Use In.	Std. Pkg.	Wt. Lbs. per 100	Per 100	Diam. and Lgth. of Shield In.	Diam. Drill to Use In.	Std. Pkg.	Wt. Lbs. per 100	Per 100
3/16x 7/8	3/16	100	1 1/4	$8.00	5/16x2 1/4	5/16	100	6	$18.00
3/16x1 1/4	3/16	100	1 1/2	9.00	5/16x2 3/4	5/16	100	7 1/2	20.00
1/4 x1	1/4	100	2 1/4	10.00	3/8 x2	3/8	100	8	20.00
1/4 x1 1/4	1/4	100	2 3/4	11.00	3/8 x3 1/4	3/8	100	14	25.00
1/4 x1 1/2	1/4	100	3 1/2	12.00	1/2 x2 1/4	1/2	50	17	30.00
5/16x1 1/4	5/16	100	3 1/2	14.00	1/2 x3 1/2	1/2	50	25	35.00
5/16x1 3/4	5/16	100	5	16.00	....	..	...	....	.....

Diamond Multi-Size Screw Anchors



Diamond Multi-Size Screw Anchors are designed to ccommodate in one anchor several diameters of wood crews. The purpose is to reduce the number of anchors reuired to accommodate all sizes of screws. They are made n several lengths covering the majority of uses. For instance, the No. 10 to 14x1-inch anchor will work successfully vith all sizes of wood screws ranging from No. 10 to No. 14 nclusive.

The high projecting interior ribs support and centrally ocate a small No. 10 wood screw causing the shield to expand and giving ample holding capacity for that size of crew.

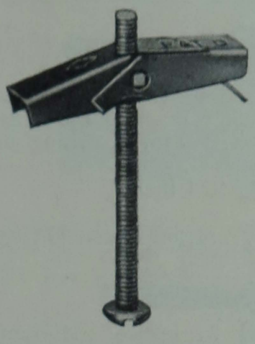
In this same size of anchor larger screws up to and including No. 14 may be used equally well. This is accomplished by the flexible interior ribbing.

Where the larger screw is used, the ribs are pressed down and the valleys at the exterior are forced outward to permit the greater diameter of the screw to enter the shield. The mproved Multi-Size Screw Anchor has two advantages over the original Multi-Size; the screw enters the shield more easily without danger of marring the head of the screw and relieves the strain applied to the screw when inserted. It will also sustain a greater load.

Packed 100 to a box.

Designating Sizes	Per 100	For Wood Screws No.	Lgth. In.	Drill Size Inches	Weight per 100
Nos. 6 to 8x 3/4"	$5.00	6 to 8	3/4	1/4	1
Nos. 6 to 8x1 1/2"	5.60	6 to 8	1 1/2	1/4	1 3/4
Nos. 10 to 14x 3/4"	5.60	10 to 14	3/4	5/16	1 1/2
Nos. 10 to 14x1 "	5.60	10 to 14	1	5/16	2
Nos. 10 to 14x1 1/2"	8.00	10 to 14	1 1/2	5/16	2 3/4
Nos. 16 to 18x1 "	6.25	16 to 18	1	3/8	3
Nos. 16 to 18x1 1/2"	9.00	16 to 18	1 1/2	3/8	4 1/4
Nos. 20 to 24x1 3/4"	10.00	20 to 24	1 3/4	7/16	5 1/4

Diamond Spring Toggles



Made with two wings that engage a trunnion nut and a spring which forces the wings outward when the head has passed through the wall.

One end of the spring is extended to prevent rotation of the head while turning in the screw.

Each wing is a complete toggle in itself and forms a bridge with bearing on both sides of the hole.

This construction gives great strength and distributes the load over a maximum of wall area.

All toggle threads are National Standard Thread.

Diamond toggle bolts and toggle heads only—packed 100 per box.

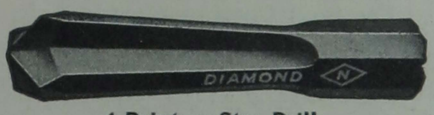
Type **R**—with round head screws. Type **F**—with flat head screws. Type **M**—with mushroom head. Furnished in **R** type 1/8 inch diameter only. Type **N**—reverse **R** or **F** screw on 2 to 4-inch lengths, 5 and 6-inch lengths threaded rods only and add nut. Type **P**—reverse **R** or **F** screw 2 to 4-inch lengths, 5 and 6-inch lengths threaded rods only and add acorn nut. Cap nuts extra.

Diam. and Lgth. of Screw In.	Per 100	Shipping Wt. Lbs. Per 100	Diam. and Lgth. of Screw In.	Per 100	Shipping Wt. Lbs. Per 100
1/8x2	$6.50	2	1/4x4	$8.15	7
1/8x3	6.75	2 1/4	1/4x5	8.55	8
1/8x4	7.00	2 3/4	1/4x6	8.95	9
3/16x3	6.85	3 3/4	5/16x3	9.85	10
3/16x4	7.15	4 1/2	5/16x4	10.15	12
3/16x5	7.50	5	5/16x5	10.55	14
3/16x6	7.80	5 3/4	5/16x6	10.95	16
1/4x3	7.85	6	.....	.....	..

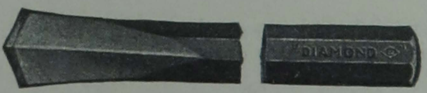
Diamond Spring Toggles—Heads Only

To Fit Bolt Diameter......inches	1/8	3/16	1/4	5/16
Per 100..........................	$6.25	6.25	6.50	8.20
Weight per 100............pounds	1	1 1/2	2 1/2	5

Diamond N Drills



4-Point or Star Drill



Diamond or Single Point Drill

Made of high grade octagon drill rod. Quality of steel is tested for uniformity. Heat treatment is scientifically conducted; heats for hardening and drawing the temper are determined by pyrometer and thermometer.

Diam. Drill In.	8 and 12-Inch Lengths: 8-In. Lgth. per Doz.	8 and 12-Inch Lengths: Wt. Lbs. per Doz.	8 and 12-Inch Lengths: 12-In. Lgth. per Doz.	18-in. Lgth.: Wt. Lbs. per Doz.	18-in. Lgth.: 18-In. Lgth. per Doz.	24-in. Lgth.: Wt. Lbs. per Doz.	24-in. Lgth.: 24-In. Lgth. per Doz.
1/4	$8.25	2	$8.50	3	$11.00	4	$13.50
5/16	8.25	3	8.50	4 1/2	11.00	6	13.50
3/8	8.25	4	8.50	6	11.00	8	13.50
7/16	8.70	5	9.00	7 1/2	11.50	10	14.00
1/2	9.65	5	10.00	7 1/2	12.50	10	15.00
9/16 & 5/8	11.65	9	12.00	13 1/2	15.00	18	17.50
11/16 & 3/4	13.70	12	14.00	18	17.50	24	20.00
7/8	15.30	15	16.00	22 1/2	20.00	30	22.50
1	17.00	21	18.00	31 1/2	22.50	42	25.00
1 1/8	23.00	27	24.00	41	28.00	54	32.00
1 1/4	.....	27	30.00	41	35.00	54	40.00
1 3/8	.....	35	40.00	53	45.00	70	50.00
1 1/2	.....	42	50.00	63	56.00	84	62.00
1 5/8	.....	42	60.00	63	66.00	84	72.00
1 3/4	.....	43	75.00	65	81.00	86	87.00
1 7/8	.....	53	90.00	80	97.00	106	104.00
2	.....	54	105.00	81	112.00	108	120.00
2 1/4	.....	55	135.00	83	145.00	110	165.00
2 1/2	.....	79	165.00	119	175.00	158	195.00

Diamond N Drill Holders and Points

Drill Holders

Drill holder and loose points is a combination which is convenient for electricians and in other lines of industry where numerous small holes must be drilled for fastening up small fixtures.

Holder will take drill points from ¼ to 1 inch.

Weight, 8½ pounds.

Holders.................................per dozen **$24.00**

Drill Points

The drills are carefully tempered to insure sufficient hardness at the point to withstand the wear of cutting and the temper is drawn away toward the shank so as to produce a softer steel where it enters the handle to prevent breaking off at that point.

Size In.	Each	Lgth. In.	Wt., Lbs.	Size In.	Each	Lgth. In.	Wt., Lbs.
¼	**$8.50**	4½	1¼	**⅝**	**$12.00**	6¼	2⅞
5/16	**8.50**	4	1⅛	**¾**	**14.00**	6	4¼
⅜	**8.50**	4½	1¼	**⅞**	**16.00**	6½	4¾
7/16	**9.00**	4	1½	**1**	**18.00**	6½	6
½	**10.00**	5	2	...	.....	...	...

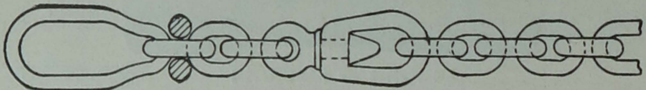
EXPANSION DEVICES

Due to the large number of expansion devices available, all styles and types cannot be listed in this catalog.

Send us your inquiry for any kind of device and we will forward full descriptive literature.

Vulcan Feed Chains

For Coal Cutting Machines

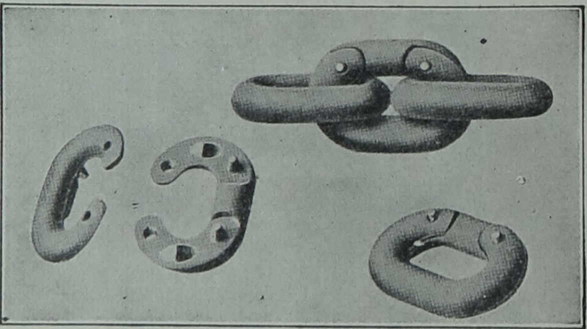


Made of special analysis steel, extremely tough and hardened to resist wear. Will not stretch in general use. Links fit accurately into pockets of sheave. Will not twist in service, drop forged steel swivel, strong as chain itself, removes all twist. Hand hold link is joined to one end of chain for convenience in handling. Tested breaking strains, 27000 to 30000 pounds. Made in 40 or 50-foot lengths complete with swivel and hand hold. Plain chain (without swivel or hand hold) can be supplied if preferred in any length desired.

Shipping weight, 40-foot lengths, 143 pounds; 50-foot lengths, 180 pounds.

Per foot.. **$.75**

Feed Chain Repair Links

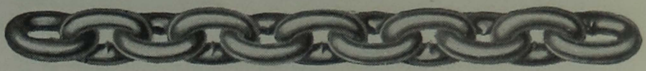


Made of drop forged steel chains; can be repaired instantly with handy repair links. Simply put 2 sections of link together and peen over pins, forming a solid link.

Per 100 Pieces.................................... **$16.50**

Columbus McKinnon Herc-Alloy Heat Treated Alloy Steel Chain

In Running Lengths



Herc-Alloy Steel Chain is made from alloy steel, containing a percentage of nickel and molybdenum. Links are Inswell electric butt welded by a new process of electric welding fully covered by patents.

Will not crystallize or develop a grain growth nearly as readily as chain made from other material, either steel or iron. This chain is made with short narrow links, reducing to a minimum, the danger of bending or gouging, when used around sharp corners.

After being welded, it is heat treated in a pyrometer controlled electric furnace.

Average Tensile Strength Per Square Inch of Material

Herc-Alloy Steel Chain—125000 lbs. after heat treatment.
Low Carbon Steel Chain—50000 lbs. to 60000 lbs.
Iron Dredge Chain—48000 lbs. to 49000 lbs.

Comparative Data

Iron Dredge Chain Grade

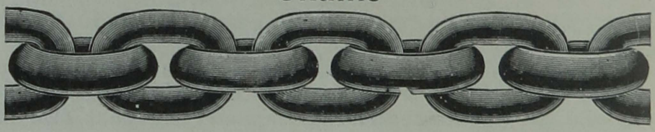
Size Inches	Safe Work. Load, Lbs.	Size Inches	Safe Work. Load, Lbs.
½	4500	**1**	18600
9/16	5580	**1 1/16**	21150
⅝	6930	**1⅛**	23400
¾	10140	**1¼**	28800
⅞	14000	**1⅜**	34500

Specifications

Size In.	Inside Dimen. Inches Length	Width	Links per Foot	Average Ultimate Load, Lbs.	Proof Test Lbs.	Safe Working Load, Lbs.	Wt., Lbs. per 100 Feet
9/32	.735	.328	16⅓	13000	6500	4800	80
5/16	.859	.373	14	17000	8500	6300	92
⅜	1.012	.453	11⅞	20500	10250	7600	133
7/16	1.235	.547	9¾	28000	14000	10500	180
½	1.402	.593	8½	38500	19250	14400	236
9/16	1.594	.672	7½	48000	24000	18000	300
⅝	1.547	.718	7¾	55000	27500	20600	380
¾	2.000	.873	6	70000	35000	26250	545
⅞	2.125	1.125	5⅔	112000	56000	42000	750

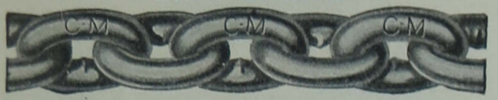
Prices upon application.

Columbus McKinnon CC Iron Dredge Chains



Trade Size In.	Outside, In. Lgth.	Outside, In. Width	Inside, In. Lgth.	Inside, In. Width	Links per Ft.	Ultimate Load Lbs.	Proof Test Lbs.	S.W. Load Lbs.	Wt. Lbs. per 100 Ft.
⅜	1⅞	1⅜	1 1/16	9/16	11⅜	7950	3975	2385	167
7/16	2⅛	1 9/16	1 3/16	⅝	10	10830	5415	3250	214
½	2⅜	1¾	1 5/16	11/16	9⅛	14145	7072	4240	280
9/16	2⅝	2	1 7/16	13/16	8⅜	17895	8947	5370	355
⅝	2 29/32	2¼	1 19/32	15/16	7½	22095	11047	6630	430
¾	3½	2⅝	1 15/16	1 1/16	6¼	31800	15900	9540	625
⅞	3 15/16	3	2⅛	1 3/16	5⅝	43245	21622	12960	810
1	4 9/16	3 5/16	2½	1¼	4¾	56550	28275	16950	1050
1⅛	5 1/16	3 11/16	2¾	1⅜	4⅜	66800	33400	20040	1435
1¼	5 9/16	4 5/16	3	1¾	4	82500	41250	24750	1650
1⅜	6 5/16	4⅝	3½	1 13/16	3½	99800	49900	29910	1960
1½	6 15/16	4 15/16	3⅞	1⅞	3⅛	118700	59350	25600	2500
1⅝	7 9/16	5 7/16	4¼	2⅛	2¾	139500	69750	41800	2740
1¾	8 5/16	5 13/16	4¾	2¼	2½	161600	80800	48450	3400
1⅞	9 1/16	6 5/16	5¼	2½	2¼	185500	92750	55300	3650
2	9 13/16	6 11/16	5¾	2⅝	2⅛	211100	105500	63300	4400

Columbus McKinnon Inswell Straight Link Chains



The Inswell Process

In the early days of welding chain by the electric process, the method of automatic welding provided for what was then known to the trade as a Swell Weld, a perfect fusion of the metal took place, leaving a swell, or flash of metal at the weld. The extra material thus developed, increased the strength of the weld approximately 25 per cent.

The welding operation is now perfected so that the outside of the link is smooth, and without any swell. All the added strength at the weld is retained by forcing, in the process of welding, all of the material to the inside of weld. Inswell process does not interfere with action of chain.

Inswell Proof Coil Chain

Trade Size Inches	Actual Size Inches	Links Feet	Wt., Lbs. per 100 Feet	Break Test Pounds	Proof Test Pounds
3/16	7/32	12 1/2	40	2090	1045
1/4	9/32	12	70	3600	1800
5/16	11/32	10 3/4	105	5440	2720
3/8	13/32	9 3/4	158	7440	3720
7/16	15/32	8 3/4	210	10000	5000
1/2	17/32	8	265	13200	6600
9/16	19/32	6 7/8	335	16400	8200
5/8	21/32	6 3/8	410	20000	10000
3/4	25/32	5 5/8	580	28300	14150
*7/8	29/32	4 3/4	780	38400	19200
*1	1 1/32	4 3/8	1000	49600	24800
*1 1/8	1 5/32	3 7/8	1270	62400	31200
*1 1/4	1 9/32	3 3/4	1560	76800	38400
*1 3/8	1 13/32	3 1/8	1860	92000	46000

Galvanized Inswell Proof Coil Chain carried in stock 3/16 to 3/4 inch inclusive.

Inswell BBB Coil Chain

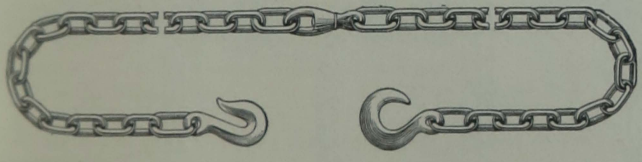
Trade Size Inches	Actual Size Inches	Links Feet	Wt., Lbs. per 100 Feet	Break Test Pounds	Proof Test Pounds
3/16	7/32	15 1/2	43	2600	1300
1/4	9/32	14	78	4500	2250
5/16	11/32	12	115	6800	3400
3/8	13/32	11	166	9300	4650
7/16	15/32	9 3/4	220	12500	6250
1/2	17/32	9	275	16500	8250
9/16	19/32	7 3/4	350	20500	10250
5/8	21/32	7 1/8	430	25000	12500
3/4	25/32	6 3/8	615	35400	17700
*7/8	29/32	5 3/8	820	48000	24000
*1	1 1/32	4 3/4	1045	62000	31000
*1 1/8	1 5/32	4 1/8	1310	78000	39000
*1 1/4	1 9/32	3 7/8	1600	96000	48000
*1 3/8	1 13/32	3 1/4	1930	115000	57500

*These sizes furnished fire-welded only.

Prices upon application.

No. 120 McKay Short Link Log Chain

Grab Hook, Slip Hook and Swivel

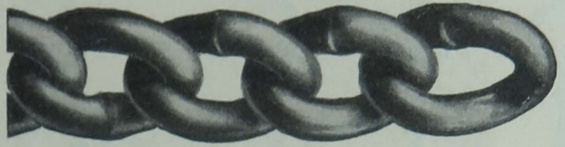


Trade Size In.	Diam. Material, In.	Ring, In. Material	Ring, In. I.D.	Inside Dimensions Links, In.	Slip Hook No.	Grab Hook No.
1/4	9/32	13/32	2 1/2	1 x 1/2	121	141
5/16	11/32	17/32	3	1 7/64 x 1/2	122	142
3/8	13/32	21/32	4	1 15/64 x 5/8	123	143
7/16	15/32	25/32	4	1 3/8 x 3/4	124	144
1/2	17/32	29/32	4	1 1/2 x 13/16	125	145
5/8	21/32	1 1/32	4	1 7/8 x 1	126	146

Furnished self-colored, unless otherwise specified.

Prices upon application.

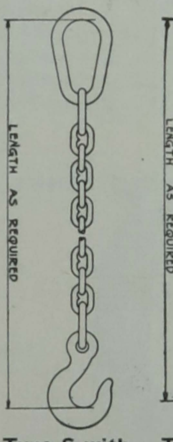
Columbus McKinnon Liberty Machine Chain



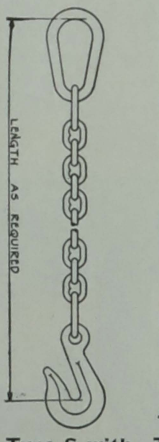
Sizes 4 to 4/0 inclusive packed 100 feet in a carton, 1000 feet in a crate. Sizes 6/0 and 5/0 packed 50 feet in a carton, 500 feet in a crate.

Trade No.	Size of Material Inches	Straight Link Links per Foot	Straight Link Weight Pounds per 100 Feet	Twist Link Links per Foot	Twist Link Weight Pounds per 100 Feet
4	1/8	21 1/2	12	23 1/2	13
3	9/64	19 3/4	16	21 1/2	16
2	5/32—	19 1/2	20	21	21
1	5/32+	19	23	20 1/2	25
1/0	11/64	16 3/4	28	17 1/2	29
2/0	3/16	15 1/4	32	16 1/2	34
3/0	13/64	14 1/2	37	15	40
4/0	7/32	13 1/2	46	14 3/4	50
5/0	8/32	12 3/4	59	14	64
6/0	9/32	12	72	13	78

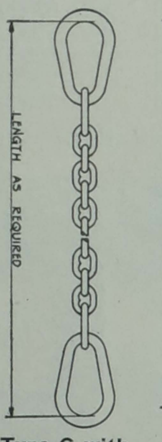
Columbus McKinnon Herc-Alloy Heat Treated Alloy Steel Sling Chain



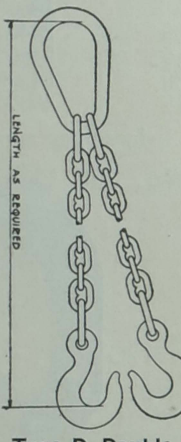
Type S with Slip Hook



Type S with Grab Hook



Type C with Pear Shaped End Links



Type D, Double Branch, with Slip Hooks

Made from alloy steel, containing a percentage of nickel and molybdenum. Links are Inswell electric butt welded.

Chain will not crystallize or develop a grain growth as readily as chain made from either steel or iron.

Made with short narrow links, reducing danger of bending or gouging to a minimum, when used around sharp corners.

Chain, after being welded, is heat treated in a pyrometer controlled electric furnace.

Average tensile strength per square inch of material used in manufacture of herc-alloy steel chain is 125000 pounds after heat treatment.

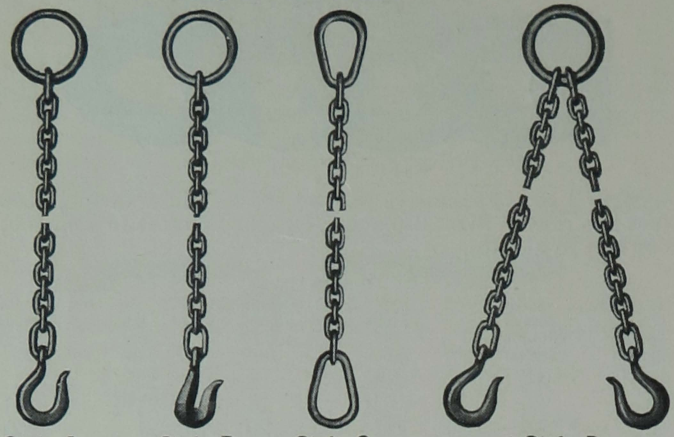
Recommended Safe Working Loads

Size Inches	Types S and C Used Straight Pounds	Type D Used at Angles 60° Angle Pounds	Type D Used at Angles 45° Angle Pounds	Type D Used at Angles 30° Angle Pounds
9/32	4800	8000	6800	4800
5/16	6300	11000	9000	6300
3/8	7600	13200	10800	7600
7/16	10500	18400	15200	10500
1/2	14400	25000	20600	14400
9/16	18000	31500	25800	18000
5/8	20600	35000	29200	20600
3/4	26250	45500	37200	26250
7/8	42000	72000	59800	42000

Prices upon application.

CC Iron Dredge Quality Sling Chains

Single and Double Branch



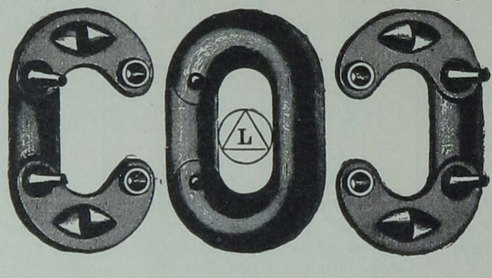
Style A **Style B** **Style C**
Single Sling Chains

Style D
Double Sling Chain

Size Chain Inches	Safe Working Load, Pounds: Single Sling Chains When Used Straight	Double Sling Chains: When Used at 60° Angle	When Used at 45° Angle	When Used at 30° Angle
3/8	2700	4700	3800	2700
7/16	3450	5900	4900	3450
1/2	4500	7800	6350	4500
5/8	6900	12000	9750	6900
3/4	10100	17500	14000	10100
7/8	14000	24000	19500	14000
1	18600	32000	26000	18600
1 1/8	23400	40000	33000	23400
1 1/4	28800	50000	40500	28800
1 3/8	34500	60000	49000	34500
1 1/2	40800	70000	57500	40800

Prices upon application.

No. 335 Drop-Forged Steel Missing Links



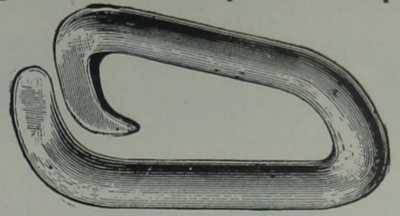
Sizes 3/16 inch packed 2 dozen in box; 1/4 to 1 inch inclusive, 1 dozen in box. Larger sizes loose.

Self-colored links sent unless otherwise ordered.

Size Inches	Per Dozen Galvanized	Per Dozen Self-Colored	Over All Dimensions Inches	Breaking Strain of Proof Chain Tons	U. S. Government Tests Tons	Weight Pounds per Dozen
3/16	$1.50	$1.15	1 3/16 x 25/32	1.1	1.2	3/8
1/4	1.50	1.15	1 1/2 x1	1.8	2.8	3/4
5/16	1.65	1.20	1 11/16x1 5/32	2.2	4.2	1
3/8	2.00	1.50	2 1/16 x1 3/8	3.7	5.6	2
7/16	2.40	1.80	2 11/32x1 17/32	5.	7.	3 1/8
1/2	2.90	2.00	2 21/32x1 23/32	6.6	8.	4 1/2
9/16	3.90	2.70	3 x1 15/16	8.2	9.6	6 5/8
5/8	4.50	3.20	3 5/16 x2 3/32	10.	11.5	9
11/16	5.50	4.10	3 9/16 x2 11/32	12.	13.5	11
3/4	6.00	4.50	3 7/8 x2 7/16	14.2	17.	14 1/4
7/8	9.25	6.75	4 1/2 x2 15/16	19.2	19.2	20 1/4
*1	14.00	11.00	5 x3 3/8	24.2	26.5	29
*1 1/8	16.50	13.50	5 5/8 x3 3/4	31.2	35.	40
*1 1/4	21.50	17.50	6 1/8 x4 1/4	38.4	42.	53 1/2
*1 3/8	27.00	24.50	6 3/4 x4 5/8	46.	56.	75
*1 1/2	34.00	30.00	7 1/4 x5 1/8	54.	64.	103
*1 5/8	41.00	37.00	8 x5 1/2	....	....	131
*1 7/8	92.00	59.00	9 7/8 x6 1/2	....	....	216

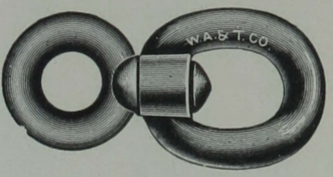
*Have reinforced rivet holes. All sizes have rivet holes countersunk.

Buckeye Polished Repair or Lap Links



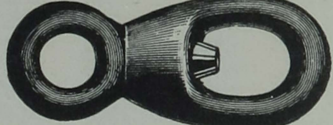
Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt Lbs
3/16x1	5	1/4 x3	20	3/8x2 1/2	36	9/16x2	84
7/32x1 1/4	8	9/32x2	20	3/8x3	41	9/16x2 1/2	96
1/4 x1 1/4	11	9/32x2 1/2	23	7/16x2	48	9/16x3	108
9/32x1 1/4	15	9/32x3	25	7/16x2 1/2	55	5/8 x2	108
5/16x1 1/2	21	5/16x2	24	7/16x3	63	5/8 x2 1/2	124
3/8 x1 5/8	31	5/16x2 1/2	28	1/2 x2	65	5/8 x3	139
1/4 x2	14	5/16x3	32	1/2 x2 1/2	74	....	...
1/4 x2 1/2	18	3/8 x2	34	1/2 x3	84	....	...

Forged Steel Swivels



No.	Size In.	Approx. Wt., Lbs. per Doz.	Price per Doz.
1194	3/8	6	**$2.85**
1195	1/2	10	**4.30**
1196	5/8	18	**6.00**
1197	3/4	30	**10.00**
1198	1	84	**20.00**

No. 400 Malleable Steel Swivels



For log chains, etc.

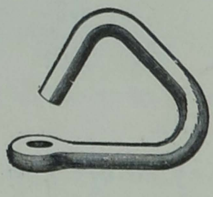
Size of Chain.......in.	**1/4**	**5/16**	**3/8**	**7/16**	**1/2**
No. **400**.........per 100	**$14.00**	**20.00**	**37.00**	**50.00**	**60.00**
Size Hole in Eye....in.	7/16	7/16	1/2	9/16	13/16
Weight per 100....lbs.	21	32	61	78	93

For chains larger than 3/8 inch the use of Forged Steel Swivels shown above is advised.

When using swivels on log chains, use next size larger than chain size.

No. 1 Cold Shuts

Self-Colored



Packed in bulk.

Size Inches	Inside Dimens., In. Length	Inside Dimens., In. Width	Approx. Wt., Lbs. per 100 Pieces	Per 100
1/4	1 1/8	7/16	9	$4.25
5/16	1 1/4	1/2	14	4.50
3/8	1 3/8	5/8	22	5.00
7/16	1 1/2	11/16	30	5.50
1/2	1 5/8	3/4	44	7.25
5/8	2	7/8	80	12.10

Centralize your purchases with us, as we are in touch with the world's largest and best manufacturers.

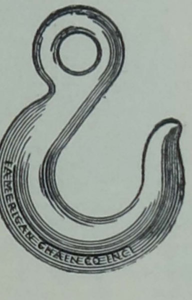
Slip Hooks

Self-Colored

Drop-forged and shaped to permit the chain to slip asily through loop.

Orders and inquiries should state the hook numbers or he size of chain on which they are to be used.

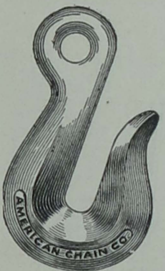
Packed in bulk. Furnished self-colored unless otherwise pecified.


AMERICAN CHAIN CO. INC.

No.	Per 100	Size Chain In.	Reach In.	Hole in Eye In.	Approx. Wt., Lbs. per 100
21	**$9.70**	1/4	2 1/2	7/16	35
22	**12.50**	5/16	2 3/4	1/2	50
23	**17.60**	3/8	3 1/4	5/8	80
24	**23.00**	7/16	3 3/4	3/4	120
25	**31.30**	1/2	4 1/8	7/8	165
26	**59.00**	5/8	5	1	290
27	**90.00**	3/4	5 3/4	1 1/8	450
28	**260.00**	7/8	6 5/8	1 1/4	865
29	**420.00**	1	8 1/2	1 3/4	1350

Grab Hooks

Self-Colored


AMERICAN CHAIN CO.

These hooks are drop-forged. When hooked over a link of chain they will not slip. Order by number or chain size.

Furnished self-colored unless otherwise specified.

Packed in bulk.

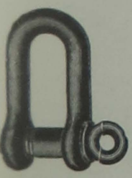
No.	Per 100	Size Chain Inches	Reach Inches	Hole in Eye Inches	Approx. Wt., Lbs. per 100
41	**$9.70**	1/4	2	3/8	26
42	**12.50**	5/16	2 1/2	1/2	50
43	**17.60**	3/8	2 13/16	5/8	80
44	**23.00**	7/16	3 3/8	3/4	130
45	**31.30**	1/2	4	7/8	160
46	**59.00**	5/8	4 3/4	1	355
47	**90.00**	3/4	5 3/4	1 1/8	685
48	**260.00**	7/8	6 7/8	1 1/4	1190
49	**420.00**	1	8	1 3/8	1940

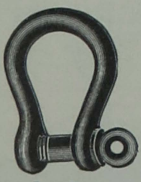
UW Shackles

Drop Forged Steel

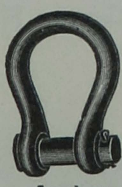
Black and Galvanized

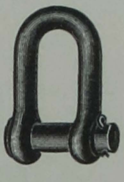
Anchor and Chain Types


Chain


Anchor

With Screw Pin


Anchor

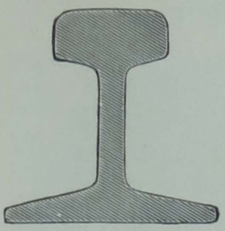

Chain

With Round Pin

Anchor and chain types, screw pin and round pin take the same prices.

Size Inches	Black Each	Galvanized Each	Size Inches	Black Each	Galvanized Each
1/4	**$.25**	**$.28**	**1**	**$1.45**	**$1.80**
5/16	**.28**	**.30**	**1 1/8**	**2.10**	**2.60**
3/8	**.33**	**.35**	**1 1/4**	**2.60**	**3.20**
7/16	**.40**	**.45**	**1 3/8**	**3.60**	**4.40**
1/2	**.45**	**.50**	**1 1/2**	**4.20**	**5.25**
5/8	**.70**	**.80**	**1 3/4**	**8.00**	**10.00**
3/4	**.75**	**.90**	**2**	**12.00**	**15.00**
7/8	**1.10**	**1.40**	...	.....	.....

Steel Rails

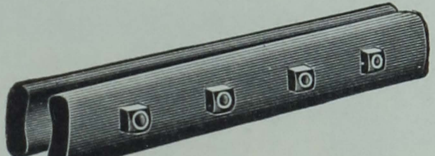


Wt. Lbs. per Yd.	Ht. In.	Width Base Flange In.	Width Head In.	Size Bolt In.
8	1 9/16	1 9/16	25/32	1 1/2x3/8
12	2 3/64	1 3/4	59/64	1 3/4x1/2
16	2 7/16	2	1 7/64	1 3/4x1/2
20	2 43/64	2 1/4	1 17/64	2 x1/2
25	2 3/4	2 1/2	1 29/64	2 1/2x5/8
30	3 11/64	2 3/4	1 19/32	2 1/2x21/32

Base price applies on 30-foot lengths with 10 per cent down to 20-foot.

We also carry 16 and 20-foot lengths in the above sizes at $.10 per cwt. advance over base. Specify lengths desired.

Splice Bars



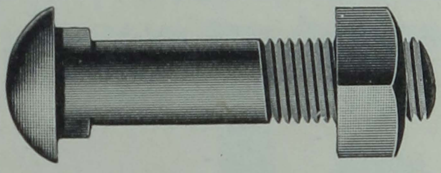
Splice bars are now sold per pair. Furnished without bolts unless specified otherwise.

Rail Used Wt. Lbs.	Wt. Lbs. per Pair	Bolt In.	SPLICES Length In.	SPLICES Thickness In.	Distance Bet. Center of Holes In.
8	2.00	1 1/2x3/8	16 1/8	7/32	4x4 1/8x4
12	3.44	1 3/4x1/2	16 1/8	5/16	4x4 1/8x4
16	4.36	1 3/4x1/2	16 1/8	5/16	4x4 1/8x4
20	4.86	2 x1/2	16 1/8	5/16	4x4 1/8x4
25	5.70	2 1/2x1/2	16 1/8	11/32	4x4 1/8x4
30	7.36	2 1/2x21/32	16 1/8	7/16	4x4 1/8x4

Special splice bars for 8-pound rails, 2 hole, 12-inch long, punched 6-inch centers are stocked for old style punched 8-pound rails.

Prices upon application.

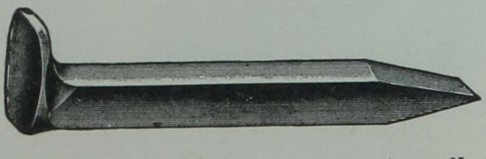
Track Bolts



Size..............in.	**3/8x1 1/2**	**1/2x1 3/4**	**1/2x2**	**1/2x2 1/4**	**21/32x2 1/2**
Approx. No. per keg 200 Lbs.............	1740	1600	900	850	485
Size Rails, per Yd..lbs.	8	12 & 16	20	25	30

Track bolts are sold per cwt. $1.00 per cwt. advance over base for broken kegs.

Track Spikes



Size In.	Approx. No. per Keg 200-Lbs.	Size Rails Wt. Lbs. per Yd.	Size In.	Approx. No. per Keg 200-Lbs.	Size Rails Wt. Lbs. per Yd.
5/16x2 1/2	2260	8 & 10	**3/8x3 1/2**	1248	16 & 18
3/8x2 1/2	1625	8 & 16	**1/2x3 1/2**	760	18 & 25
3/8x3	1400	12 & 14	**1/2x4**	642	25 & 30

Track spikes are sold per cwt. $1.00 per cwt. advance over base price for broken kegs.

Quantities of Rails and Accessories Required

Quantities of rails and accessories required to lay one mile of single track, based on standard practice, viz.: 30-foot rails with 10 per cent shorts down to 20 feet. Quantities of spikes based on 2-foot center to center. No. excess has been allowed.

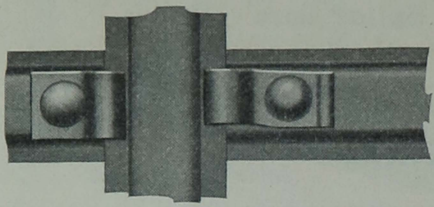
Size of Rail......lbs.	**8**	**12**	**16**	**20**	**25**	**30**
Rails..........gr. ton	12.57	18.86	25.14	31.43	39.29	47.14
Splices.... .....pairs	360	360	360	360	360	360
Bolts... ....lbs.	133	276	276	293	302	594
Spikes.. ....lbs.	935	1509	1693	2779	3234	3290

Bethlehem Steel Mine Ties

These ties hold rails securely, and to gage, keeping track in alignment. They have long life, even under the most severe conditions, cannot become spike-killed or rotted, and possess high scrap value. They give increased headroom. They are not a fire hazard. They are light in weight, readily portable, and are easily and quickly installed.

Manufactured of high-grade rolled steel and painted red. The ties are complete in themselves, and are made for any weight or section of rail and any gage of track, above or below ground.

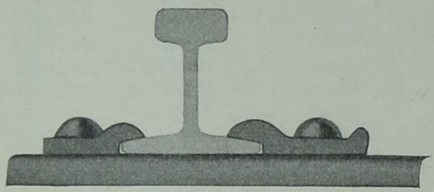
No. 1



Recommended for use with light rails weighing from 12 to 20 pounds per yard. The tie section weighs 1¼ pounds per foot.

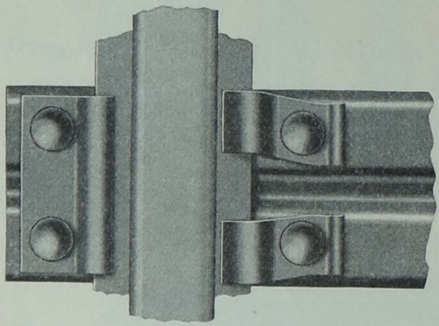
These ties can be furnished with a wide variety of riveted clips, movable and stationary, and bolted clips. Riveted fastenings are regularly furnished with movable clips inside unless otherwise specified. Illustration shows the top view of 1 end of the tie, the clips used are the standard riveted clips, movable clip on the right. Has ample striking surface.

No. 2



Can be furnished with many different varieties of both riveted and bolted clip arrangements. Illustration shows side view of tie with standard riveted clips. Tie is 4⅛ inches wide at the bottom and weighs 2½ pounds per foot. Used with rails weighing from 16 to 30 pounds per yard.

No. 3



Furnished in many clip combinations to meet virtually any conditions.

This tie is 5 inches wide at the bottom and weighs 3¼ pounds per foot. It is used with rails weighing 30 and 40 pounds per yard.

Prices upon application.

Mine TRACK EQUIPMENT

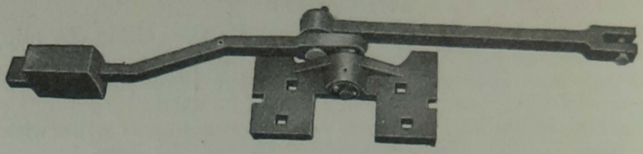
•

WE CAN FURNISH any kind of mine track equipment to meet today's demands; such as frogs, switches, turnouts, fastenings, crossings, etc.

We handle the above lines made by the C.S. Card Iron Works of Denver who can manufacture all kinds of track equipment made to special specifications.

Estimates gladly furnished on receipt of your requirements.

Ground Throw Switch Stands

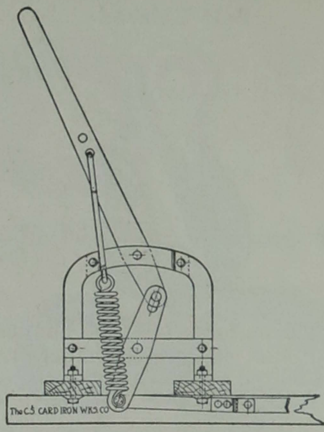


A well made ground throw, substantially finished. Except the base plate, all parts are steel forgings. All wearing parts are steel forgings. All wearing parts are machine finished.

This throw is popular with the mining and industrial trade. Made in 3 sizes for the different weight rails. The throw can be varied from the standard shown, if desired.

Throw No.	Weight Pounds Rail	Standard Throw Inches	Price Each	Throw No.	Weight Pounds Rail	Standard Throw Inches	Price Each
978	20 and Under	4	**$7.35**	**922**	48 to 90	5	**$12.00**
863	25 to 45	4	**9.50**	...	....	..	.....

Malone Switch Stands

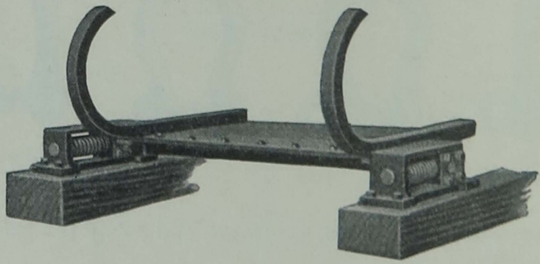


The Malone Switch Stand is the practical development of an ordinary spring switch, a positive switch car actuated, or ground throw, combining the good qualities of all in one device. The switch points can be thrown by hand or automatically thrown by the car, and the stand is so constructed that it holds the switch rigidly, either in the closed or open position.

It is simple in construction and positive in its action, having 2 springs which hold the points rigid. It will be found a great convenience in all classes of mining and industrial railways.

Size No.	Size of Rail	Maximum Throw Inches	Weight Pounds	Price Each
2	20 to 25	4	41	**$10.80**
3	30 to 40	4½	57	**13.20**
4	45 to 55	5	74	**15.00**

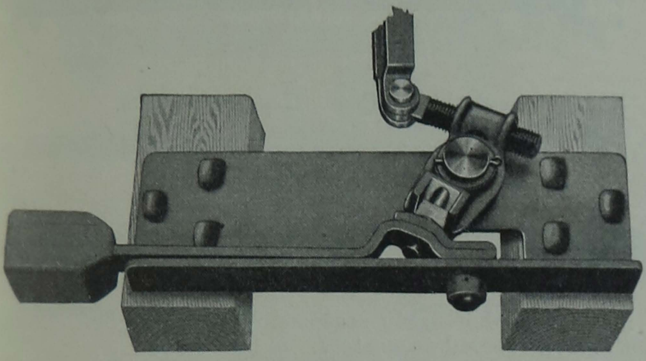
Goose Neck Dumps



A popular inexpensive type of dump which operates by gravity, for coal tipples, rock dumps, etc. Substantially constructed of steel throughout and will withstand most severe service. When ordering specify track gauge, diameter of wheels and wheel base (distance center to center of axles). If wheel base is off center of car send sketch showing location. Furnished with Card Spring Journal Boxes.

	Std. Heavy			Extra Heavy		
Gauge....inches	**30**	**36**	**42**	**30**	**36**	**42**
Price......each	**$77.50**	**80.00**	**82.50**	**97.00**	**101.00**	**105.00**

Model 1200 Parallel-Throw Switch Stands



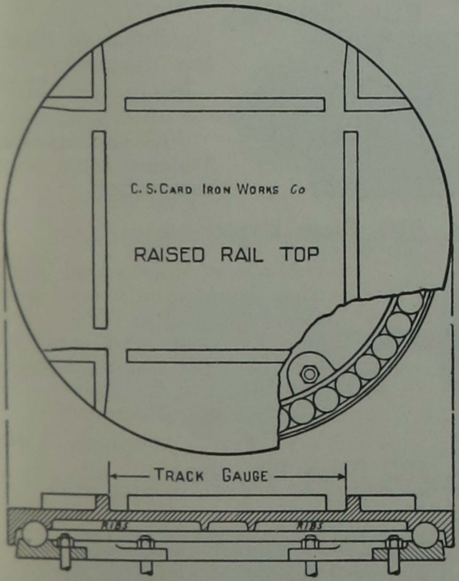
This stand for light rails has a rolled steel base. A weighted throwing lever, operating parallel to the track, insures the safety of the operator, makes throwing easier and provides positive closing of the switch points. When in normal position the weighted lever is on dead center and does not require latches.

No bolts are used in the construction of the stand and there are only 3 moving parts, the throwing lever, the crank and the sliding block. The stand can be easily disassembled in the field by simply removing 1 cotter pin. The stand has a height of only 3 inches, measured from the top of the ties. All moving parts are above the ties where they are readily accessible and free from dirt. The stand is self-cleaning. A slot in the base, beneath the sliding block, allows dirt to pass through to the space between the ties. The crank is slotted to prevent clogging. Easy and quick adjustment of the throw of either switch point is provided by an adjustable screw-eye crank.

Range of adjustment, 2½ inches to 5 inches.

Prices upon application.

Card Ball-Bearing Turntables



Raised Rail Top

Can be used to advantage in and about mines, quarries and industrial plants, where the use of a switch or switches is impractical.

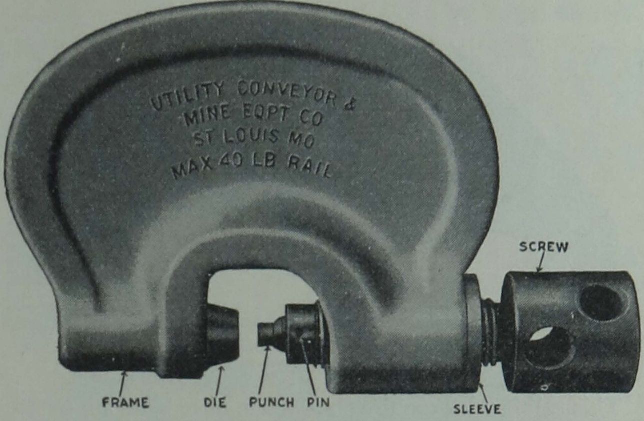
Designed with the balls located as closely as possible to the outside, which gives stability, especially when the car is run on the table.

The downward projection on the outside edge of the table strengthens it and helps prevent dirt from entering the race.

Furnished with either smooth or corrugated flat, dome, or raised rail top. In ordering, always specify style of table top and track gage for dome and raised rail tops.

Top Diameter.............in.	**34**	**40**	**48**	**60**
Each..........................	**$53.46**	**61.16**	**71.66**	**89.90**
Max. Wheel Base Recommended,				
18-Inch Gage............in.	18	26	34	46
24-Inch Gage............in.	..	20	30	42
30-Inch Gage............in.	..	..	24	38
36-Inch Gage............in.	..	..	..	32
42-Inch Gage............in.	..	..	..	26
Weight....................lbs.	430	560	760	1060

Umeco Rail Punches



Made of special heat treated aluminum alloys; has the strength of steel but weighs only ⅓ as much. Can be carried from place to place with ease. It has a place in the car knockers and tipple, as well as on the section. Equipped with 1 die and punch. All wearing parts are made of high-grade alloy steels heat treated to insure a tool of lasting quality and efficiency. All wearing parts are replaceable.

When ordering specify the size bolt used. These punches are made 1/64 of an inch larger than the bolt to be used.

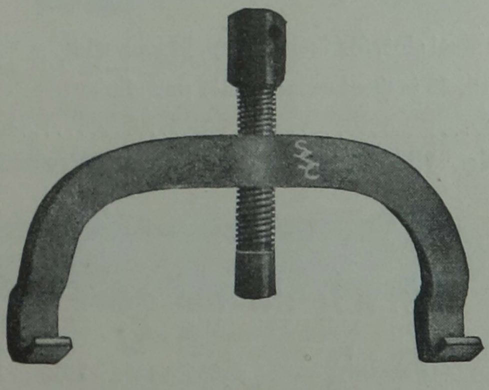
Die sets regularly furnished in the following sizes: ½, ⅝, ¾ and ⅞-inch. Special sets can be had at a slight additional charge.

No......................................	**10**	**15**
Each....................................	**$45.00**	**60.00**
Weight.........................pounds	24	26
For Rail.......................pounds	12 to 40	12 to 60

Extra die sets, $5.50 per set.

Chicago Screw Type Rail Benders

Without Cross Bar



The Chicago is widely used in mines because of its compactness. May be used for many purposes.

Forged from best open hearth steel.

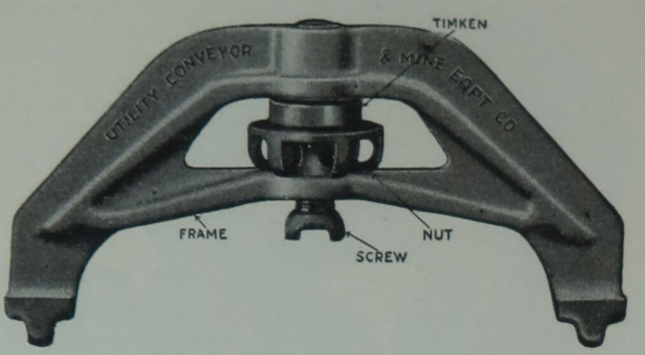
Has square machine cut threads three to the inch, and a steel screw.

Malleable cap to fit rails.

Furnished with or without steel lever.

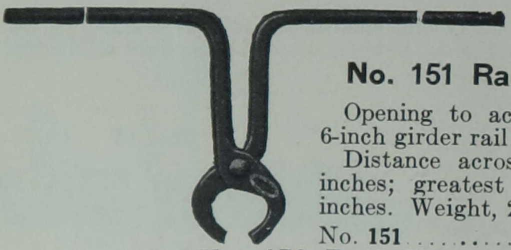
No.	Each	Cap. Size of Rail Pounds	Span of Hooks Inches	Diam. of Screw Inches	Weight Each Pounds
0	**$60.00**	135	30	3	200
1	**50.00**	100	30	2¾	170
2	**43.00**	85	30	2⅝	145
3	**32.50**	75	24	2½	110
4	**24.50**	50	20	2¼	85
5	**20.50**	25	16	2	65
6	**18.00**	16	14	1¾	40
7	**17.00**	10	14	1½	30

Umeco Rail Benders


UTILITY CONVEYOR & MINE EQPT CO
TIMKEN
FRAME
NUT
SCREW

This rail bender requires but one man to bend 30, 40, 56, or 60-pound rails. It is designed so that it can be set by the spin of a nut. Of very light weight which factor eliminates the cost of gathering motor transportation. Is a guaranteed tool in which is incorporated the best-grade of steel and aluminum alloy, heat treated and tempered. Equipped with Timken thrust bearing.

No.	20-B	30-B	40-B	50-B
Each	**$23.50**	**31.00**	**48.50**	**65.00**
Weight ....pounds	20	24	44	54
For Rails ....pounds	15 to 25	25 to 40	40 to 60	80 to 100



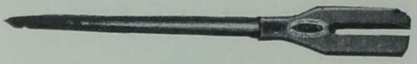
No. 151 Rail Tongs

Opening to accommodate a 6-inch girder rail.

Distance across handles, 44 inches; greatest opening, 3¼ inches. Weight, 20 pounds.

No. **151** .... each **$3.72**

No. 150 Rail Forks

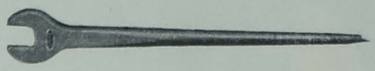


Solid steel slot, 5¼ inches deep, ¾ inch wide.

Length, 30 inches; weight, 13½ pounds.

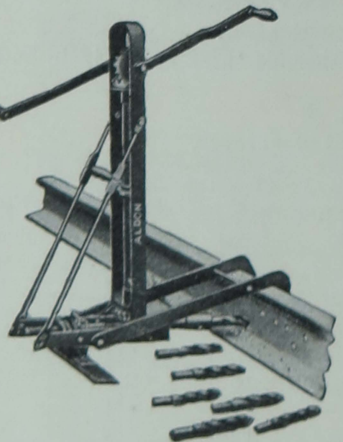
No. **150** .... each **$2.86**

No. 153 Single End Track Wrenches



Bolt ....in.	¾	⅞	1	1⅛	1¼	1⅜	1½
Each	**$1.34**	**1.46**	**1.58**	**2.00**	**2.18**	**2.90**	**3.36**
Opening ....in.	1 5/16	1½	1 11/16	1⅞	2 1/16	2¼	2 7/16
Length ....in.	30	30	36	36	42	48	48
Weight ...lbs.	5½	6½	8½	11¾	13¾	15	17

Standard Track Drills



This Standard Track Drill has an automatic feed.

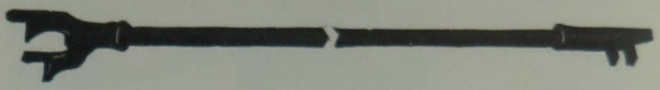
It takes twist bits having ⅝-inch round shank.

Price given below does not include bits.

Weight, 65 pounds.

For Twist Bits.ea.	**$25.00**
For Rich Flat Bits.......each	**30.00**

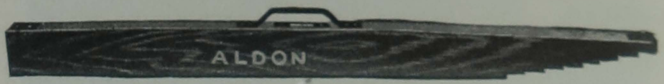
Huntington Track Gauges



Ends are malleable castings. Has pipe centers.
Weight, per dozen, 120 pounds.

Price .... per dozen **$24.00**

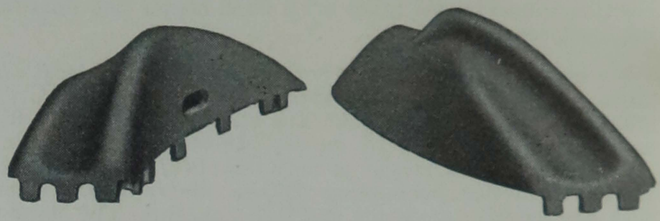
Aldon Track Levels



Made from thoroughly seasoned Washington fir. Bound with steel. Tested accurately.
Weight per dozen, 120 pounds.

Price .... per dozen **$24.00**

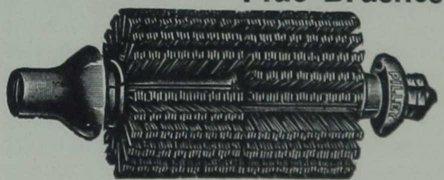
Alexander Car Replacers



Made from pressed steel plate to give additional strength of material and less weight to carry and handle.

No.	Height of Rail, Inches	Weight per Pair Pounds	Per Pair
1 Extra Heavy	6	212	**$40.00**
1 Standard	6	164	**30.00**
2 "	4½ to 5½	158	**30.00**
3 Light	Under 4½	68	**23.00**

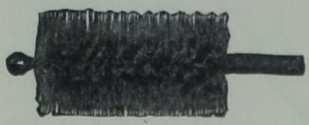
No. 555 Pilley's Improved Expansion Flue Brushes



For Tubes, in. 1½ to 9
Per diameter in.......... **$1.00**

Sizes smaller than 2 inches same price as 2 inches.

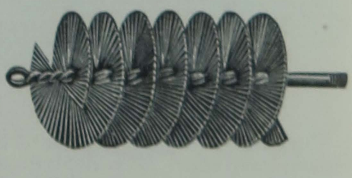
No. 610 Flue Brushes



Made of fine round steel wire, mounted on twisted wire center. Brush part 4½ inches long. Length over all, 7½ inches. Has ¼-inch pipe connection. Made in all sizes from 1 to 6 inches actual diameter.

Price, No. **610**............................. per inch **$1.00**

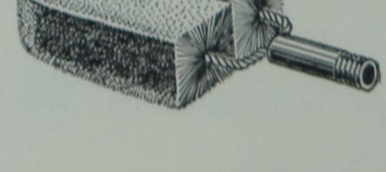
No. 585 Flue Brushes



Made of tempered flat steel wire. Made to fit all sizes of tubes from 1 to 6 inches.
Price, No. **585**.per inch **$1.00**

Sizes smaller than 2-inch, same price as 2-inch.

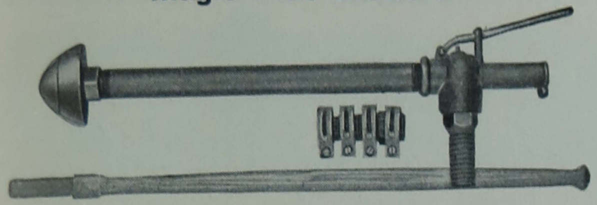
Pilley Wire Boiler Brushes



Made of fine round steel wire. Has ¼-inch pipe connection.

No.	Each	Size, Inches
6271	**$1.50**	1¾x4½x6
6272	**2.00**	2 x4½x6
6273	**2.50**	2½x6 x6
6274	**3.00**	2¾x6 x6

Magic Flue Blowers

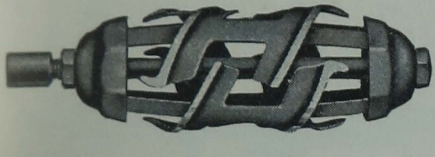


Stuffing box in the valve eliminates possibility of steam escaping under the lever.

Price is for blower with wood handle, clamps and nipple only—hose extra.

No.	Hose Connection Inches	O.D. Tubes Inches	Price Each	No.	Hose Connection Inches	O.D. Tubes Inches	Price Each
1	½	2 -2¼	$5.00	4	1	3½-3¾	$8.75
2	¾	2½-2¾	6.25	5	1¼	4 -4½	10.00
3	1	3 -3¼	7.50	6	1½	5 -6	12.50

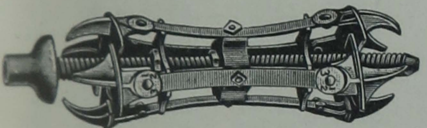
Chicago Boiler Tube Cleaners



Removes scale and soot from boiler tubes; cuts both ways, and cuts under; does not ride over scale. Sizes under 2″ take 2″ list.

Per Inch.. **$1.25**

No. 570 Pilley's Engineer's Favorite Flue Scrapers

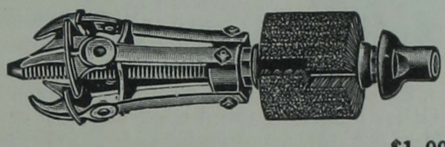


Sizes are for outside diameter of tubes from 1¾ to 6 inches.

Shipping weight, per inch, 1 pound.

No. 570...............................inch diameter **$1.00**

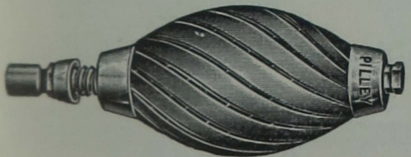
No. 550 Pilley's Combination Flue Brushes and Scrapers



Made for all size tubes from 2 to 6 inches.

Per Diameter Inch.................................... **$1.00**

No. 565 Pilley's Elliptical Scrapers

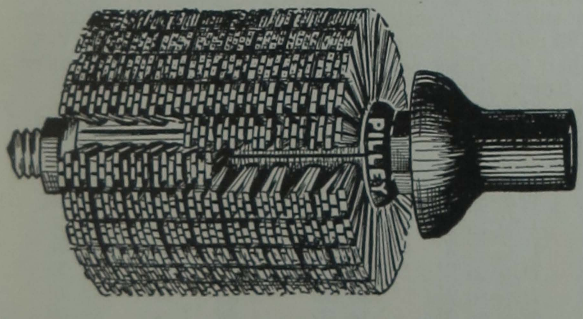


Fits tubes from 1½ to 6 inches.

Price........ per diam. in. **$1.00**

Sizes smaller than 2 inches same price as 2-inch.

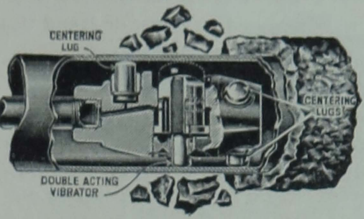
No. 575 Pilley's Abrams Flue Brushes



Made on a steel center with flat steel wire.
Made to fit all sizes of flues from 2 to 6 inches.
Shipping weight about 8 ounces per diameter inch.

No. 575.................................per diameter inch **$1.00**

Torpedo Boiler Tube Cleaners



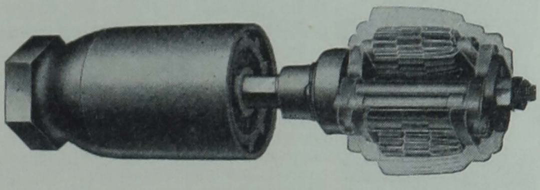
For Fire Tube Boilers

A scientifically designed cleaner that taps the tube walls with just enough force to loosen the scale.

Operated by either air or steam at from 60 to 90 pounds.

Size In.	Wt. Lbs.	Price Each	Size In.	Wt. Lbs.	Price Each	Size In.	Wt. Lbs.	Price Each
2	11	$135.00	3	16	$135.00	4	18	$135.00
2½	12	135.00	3½	17	135.00	4½.	19	135.00

Gesco Boiler Tube Cleaners



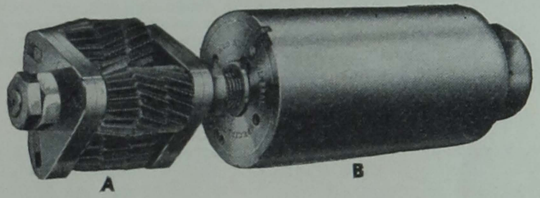
A water driven cleaner for water tube boilers.

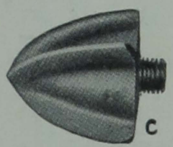
Operated with a pressure of from 75 to 100 pounds for best results. Size, 4 inches. Weight, 20 pounds.

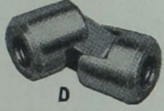
Price.......................................each **$165.00**

Demon Boiler Tube Cleaners

Air Driven Type



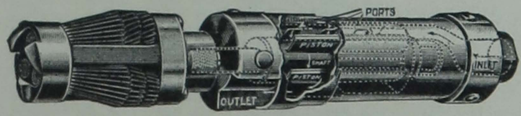




Operated by air pressure of 60 to 100 pounds. The equipment furnished with the cleaner is: A—cutter head; B—motor; C—drill head; D—universal joint.

Price, Size, 3½ Inches; Weight, 22 Pounds....each **$165.00**
" " 4 " " 24 " .... " **165.00**

Water Driven Type

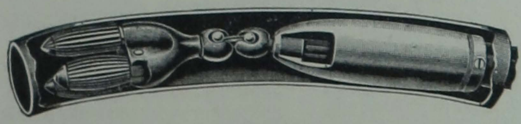


For Straight Tubes

This cleaner is equipped with a powerful piston type motor operated by water pressure of 100 to 150 pounds.

The 3 cutter head shafts are non-yielding and the cutters are set to just fit the inside diameter of a clean tube.

The cutters cannot ride over scale and they cannot dig into the tube wall.



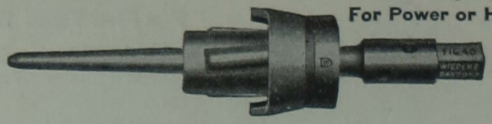
For Curved Tubes

The cutter head just fits the tube when clean. Two of the cutters arms are non-yielding, the third yielding slightly to pass the bends and flats.

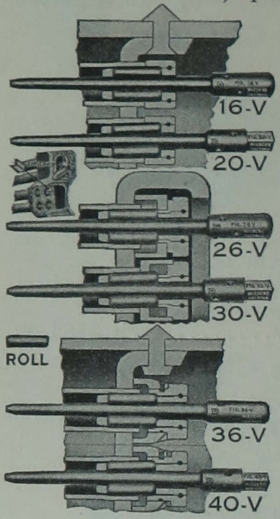
Straight Tube Demon			Curved Tube Demon		
Size Inches	Weight Pounds	Price Each	Size Inches	Weight Pounds	Price Each
3	17	$165.00	3	17	$165.00
3½	26	165.00	3¼	17	165.00
4	28	165.00	4	21	165.00

No. 40 Wiedeke Ideal Ace Tube Expanders

For Power or Hand Use



Railroads, Boilermakers & Engineers, Ideal all steel, heat treated, Boiler & Heater Tube Expanders withstand severe power production strains. Steel frame and rear collar is one piece on all IDEAL expanders insuring a solid bearing for guard, which straddles straight, beaded or flared tubes, works close to shell and on narrow bridges. Long reversible rolls double service, operate easier and cannot fall in or out of frames when mandrels are removed. All mandrels, also rolls interchange in these six expanders, adaptable for completing most jobs.



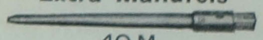
Power Expanders No. 40-30-20 are self feeding, rolls lay at angle to mandrel insuring gradual feed, steady and even expansion when power is applied. To release, reverse power. No hammer required, can also be used by hand. No. 40 Ideal Ace specified mostly, has a frictionless bearing, which cannot get out of order. No. 30 Ideal Universal has reversible telescopic collar, rotates freely, straddles tube, when reversed is rigid working in direct contact with tube. No. 20 Ideal Victor has least parts. Has ample bearing for working in direct contact with straight, beaded or flared tubes, will not draw tube out of tube sheet.

Hand Expanders No. 36-26-16 embody above features, except rolls lay parallel with mandrel and are for hand use only.

When Ordering always state number and largest size expander to enter your straight or swedged tubes, pipe or hydraulic pipe. List shows smallest inside diameter expanders will enter and expand to.

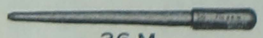
Size of Expander for O.D. Tubes, In.	Enters I.D. Tubes and Expands to Inches	Expander Complete No 40 No. 36 Each	Expander Complete No. 30 No. 26 Each	Expander Complete No. 20 No. 16 Each	Extra Mandrels Each	Extra Rolls Each	Approx. Ship. Wt. Expander Lbs.
15/16	25/32 to 29/32	$16.00	.....	.....	$3.50	$.30	4
1	27/32 to 1	16.00	.....	$10.50	3.50	.30	4
1 1/16	⅞ to 1 1/32	16.00	.....	.....	3.50	.30	4
1⅛	15/16 to 1⅛	16.00	.....	10.50	3.50	.30	4
1 3/16	1 to 1 5/32	16.00	.....	.....	3.50	.30	4
1¼	1 1/16 to 1¼	16.00	.....	10.50	3.50	.30	4
1 5/16	1 3/32 to 1 5/16	16.00	.....	.....	3.50	.30	4
1⅜	1 5/32 to 1⅜	16.00	.....	10.50	3.50	.30	4
1 7/16	1 7/32 to 1 7/16	16.00	.....	.....	3.50	.30	5
1½	1 9/32 to 1½	16.00	.....	10.50	3.50	.30	5
1⅝	1⅜ to 1⅝	16.00	$16.00	10.50	3.50	.30	7
1¾	1½ to 1¾	16.00	16.00	11.00	3.50	.30	7
1⅞	1 39/64 to 1⅞	16.00	16.00	12.50	3.50	.30	7
2	1 23/32 to 2	16.00	16.00	13.00	3.50	.30	8
2⅛	1 13/16 to 2⅛	18.00	18.00	15.00	3.50	.30	8
2¼	1 15/16 to 2¼	18.00	18.00	15.50	3.50	.30	9
2⅜	2 1/16 to 2⅜	19.50	19.50	16.50	4.50	.30	9
2½	2 5/32 to 2½	19.50	19.50	17.00	4.50	.30	12
2⅝	2 9/32 to 2⅝	22.00	.....	18.00	4.50	.60	12
2¾	2 13/32 to 2¾	22.00	22.00	19.00	4.50	.60	17
2⅞	2½ to 2⅞	22.00	22.00	.....	5.50	.60	18
3	2⅝ to 3	22.00	22.00	20.00	5.50	.60	19
3¼	2⅞ to 3¼	24.50	24.50	22.00	5.50	.70	22
3½	3⅛ to 3½	24.50	24.50	24.00	6.50	.70	23
3¾	3⅜ to 3¾	27.00	27.00	26.00	6.50	.80	25
4	3 9/16 to 4	27.00	27.00	27.00	7.50	.80	27
4¼	3 13/16 to 4¼	40.00	.....	.....	10.00	1.10	30
4½	4 1/16 to 4½	50.00	50.00	.....	10.00	1.10	31
4¾	4¼ to 4¾	55.00	.....	.....	15.00	2.00	31
5	4½ to 5	55.00	.....	.....	15.00	2.00	37
5¼	4 11/16 to 5¼	60.00	.....	.....	18.00	2.50	38
5½	4 15/16 to 5½	60.00	.....	.....	18.00	2.50	44
6	5⅜ to 6	65.00	.....	.....	20.00	3.00	47

Extra Mandrels


40-M

40-M2

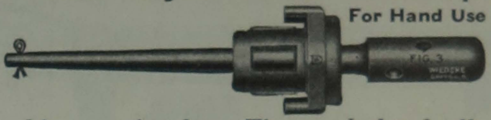
40-M3


36-M

Extra Ideal Mandrels	For Expanders Sizes Inches	Size Shank Inches
40-M For Power or Hand use	15/16 to 1½ 1⅝ to 2¾ 2⅞ to 6	½ ☐ 1 Long ¾ ☐ 1¼ " 1 ☐ 1¼ "
40-M2 For Power use only	15/16 to 1½ 1⅝ to 2¾ 2⅞ to 6	½ ☐ 1½ " ¾ ☐ 2 " 1 ☐ 2 "
40-M3 For Power use only	15/16 to 1½ 1⅝ to 2¾ 2⅞ to 4½	No. 1 Morse Taper No. 3 " " No. 4 " "
36-M For Hand use only	15/16 to 6	All Round Heads

No. 3 Wiedeke Dayton Roller Tube Expanders

For Hand Use



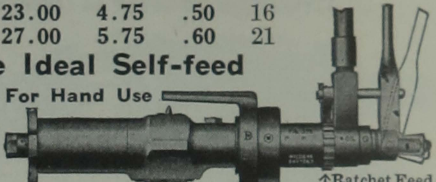
Designed for occasional use. The mandrel and rolls are tool steel and hardened. The frame and rear collar is one piece, impossible to lose collar. Guard can be removed.

When Ordering select largest size expander that enters your I. D. tubes, see list.

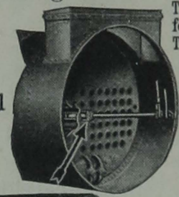
Size of Expander for O.D. Tubes, In.	Enters I.D. Tubes and Expands to Inches	Expander Complete Each	Extra Mandrels Each	Extra Rolls Each	Approx. Ship. Wt. Expander Lbs.
1	25/32 to 29/32	$10.00	$2.00	$.20	2
1¼	1 to 1 5/32	10.00	2.00	.20	2
1½	1 7/32 to 1 7/16	10.00	2.00	.20	2
1¾	1½ to 1¾	10.00	2.00	.20	4
2	1 23/32 to 2	10.00	2.00	.20	6
2¼	1 15/16 to 2¼	12.00	2.00	.20	6
2½	2 5/32 to 2½	14.00	2.50	.20	8
2¾	2 13/32 to 2¾	16.00	3.25	.35	9
3	2⅝ to 3	18.00	3.75	.35	11
3¼	2⅞ to 3¼	20.00	4.25	.50	14
3½	3⅛ to 3½	23.00	4.75	.50	16
4	3 9/16 to 4	27.00	5.75	.60	21

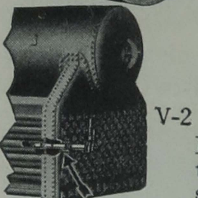
No. 375 Wiedeke Ideal Self-feed Tube Cutters

For Hand Use



Cuts off new or old tubes uniformly with a flare or bevel ready to bead or weld. Avoids cracking tubes.


V-1


V-2

Size of Tube Cutter for O.D. Tubes, In.	Enters and Cuts Tubes I.D. Inches	Tube Cutter Complete Each	Extra Cutters Each	Extra Cutters Per Doz.	Approx. Ship. Wt. Tube Cutter Lbs.
2	1 23/32	$30.00	$.80	$4.80	18
2¼	1 31/32	32.00	.80	4.80	19
2½	2 7/32	34.00	.80	4.80	20
2¾	2 15/32	36.00	.80	4.80	22
3	2 11/16	44.00	.80	4.80	29
3¼	2⅞	46.00	.80	4.80	30
3½	3⅛	48.00	.80	4.80	32
4	3⅝	50.00	.80	4.80	33
4½	4 1/16	80.00	1.60	9.60	51
5½	4 15/16	95.00	2.00	12.00	55

No. 377 Extensions

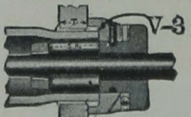
Connect Extension to reach in smoke box (V-1) or through water leg (V-2).

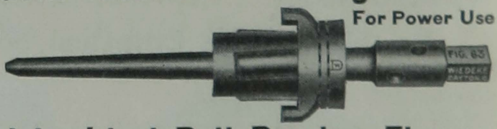
No. **D-1½** fits tube cutters 2" to 2¾", length 19", wt. 9 lbs. $8.00
No. **E-1½** fits tube cutters 3" to 4", length 19", wt. 12 lbs. 8.00

Other lengths quoted upon request, give distance at XX.

No. 63 Wiedeke Ideal Ball Bearing Roller

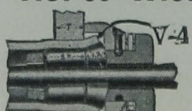
For Power Use

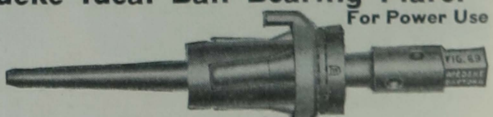

V-3



No. 69 Wiedeke Ideal Ball Bearing Flarer

For Power Use


V-4

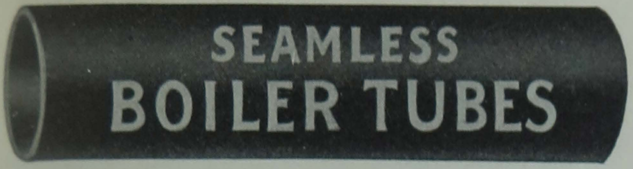


Designed for Service, all steel, self-feeding, can also be used by hand. Rolls cannot fall out of frame. No. 63 sets and rolls tube uniformly for bead in one operation, see V-3. No. 69 rolls and flares tube in one operation, see V-4.

When Ordering select largest expanders that enter your I.D. tubes, see list.

Size of Expander for O.D. Tubes, In.	Enters I.D. Tubes and Expands to Inches	Expander Complete No. 63 No. 69 Each	Extra Mandrels Each	Extra Straight Roll 63-R Each	Extra Combination Roll 69-R Complete	Approx. Ship. Wt. Expander Lbs.
1⅝	1⅜ to 1⅝	$16.00	$3.50	$.30	$2.00	7
1¾	1½ to 1¾	16.00	3.50	.30	2.00	7
1⅞	1 39/64 to 1⅞	16.00	3.50	.30	2.00	7
2	1 23/32 to 2	16.00	3.50	.30	2.00	8
2⅛	1 13/16 to 2⅛	18.00	3.50	.30	2.20	8
2¼	1 15/16 to 2¼	18.00	3.50	.30	2.40	9
2½	2 5/32 to 2½	19.50	4.50	.30	2.60	12
3	2⅝ to 3	22.00	5.50	.60	3.00	19
3¼	2⅞ to 3¼	24.50	5.50	.70	3.20	22
3½	3⅛ to 3½	24.50	6.50	.70	3.60	23
4	3 9/16 to 4	27.00	7.50	.80	4.00	27

Hot Rolled Seamless Steel Boiler Tubes



All tubes are manufactured and tested in accordance with the latest rules and regulations of the board of supervising inspectors, bureau of navigation and steamboat inspection.

They conform to the A.S.T.M. specification for lap-welded, seamless and lapwelded charcoal iron boiler tubes, serial designation A-83-33 and with the A.S.M.E. power boiler code, 1933 edition.

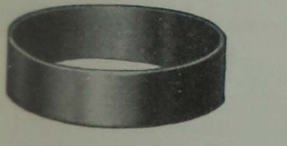
O.D. In.	Std. Thick. Minimum B.W.G.	Std. Thick. Minimum Inches	Nominal Weight per Foot, Pounds for Estimating Purposes (A.S.M.E.) Std. Thickness	One Extra Gage	2 Extra Gage	3 Extra Gage	4 Extra Gage
1	13	.095	1.037	1.168	1.263	1.384	1.500
1¼	13	.095	1.328	1.502	1.638	1.793	1.951
1½	13	.095	1.619	1.836	1.994	2.201	2.402
1¾	13	.095	1.910	2.169	2.360	2.610	2.854
2	13	.095	2.201	2.503	2.726	3.018	3.305
2¼	13	.095	2.492	2.837	3.092	3.427	3.756
2½	12	.109	3.171	3.457	3.835	4.207	4.665
2¾	12	.109	3.504	3.823	4.244	4.658	5.169
3	12	.109	3.838	4.189	4.652	5.110	5.674
3¼	11	.120	4.555	5.061	5.561	6.179	6.697
3½	11	.120	4.921	5.469	6.012	6.683	7.247
4	10	.134	6.286	6.915	7.693	8.347	9.336
4½	10	.134	7.103	7.817	8.702	9.447	10.580
5	9	.148	8.720	9.711	10.550	11.810	12.730
6	7	.180	12.750	14.290	15.410	16.640	17.450

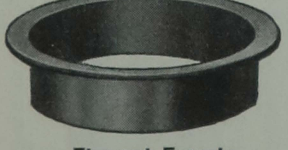
Boiler tubes are cut to exact length without leaving a burr on the tube. A small charge is added for cutting to lengths. Safe ends of any diameter and length are available for stock. Stock tubes do not have annealed ends. If desired, we can anneal the ends in our shop at a small extra cost.

Bent Boiler Tubes

We are in a position to promptly furnish bent boiler tubes for all standard types of boilers. Please let us have name and type of boiler as well as tube number for quotation.

Copper Boiler Tube Ferrules


Plain Ferrule


Flanged Ferrule

I.D. In.	Width In.	1/32 Inch Thick Per 100	1/32 Inch Thick Wt. Lbs. per 100	1/16 Inch Thick Per 100	1/16 Inch Thick Wt. Lbs. per 100
1½	⅝	**$9.30**	3.03	**$17.00**	6.19
1½	¾	**12.90**	3.63	**20.00**	7.41
1¾	⅝	**10.80**	3.53	**20.25**	7.18
1¾	¾	**12.90**	4.23	**24.25**	8.62
1⅞	⅝	.....	....	**21.50**	7.68
1⅞	¾	.....	....	**26.00**	9.22
2	⅝	**12.30**	4.02	**23.00**	8.18
2	¾	**14.80**	4.83	**27.75**	9.81
2¼	⅝	**13.50**	4.52	**25.25**	9.17
2¼	¾	**16.30**	5.42	**30.50**	11.00
2½	⅝	**15.00**	5.02	**28.25**	10.16
2½	¾	**18.10**	6.02	**34.00**	12.19
2¾	¾	.....	....	**41.00**	13.34
3	¾	**21.90**	7.21	**41.00**	14.57
3¼	¾	.....	....	**44.25**	15.76
3½	¾	**24.60**	8.40	**45.75**	16.95
4	¾	**33.60**	9.54	**63.00**	19.28

Flanged ferrules or special sizes of either plain or flanged ferrules can be furnished promptly from the factory.

Useful Information

Steam

A good automatic non-condensing engine requires from 3 to 4 pounds of coal per horse power per hour, according to the quality of the coal.

An automatic condensing engine requires from 2¼ to 3½ pounds of coal per horse power per hour.

A steam-jacketed compound condensing engine of the most improved construction may reduce the consumption of coal as low as 1¾ to 2 pounds of coal per horse power per hour.

The average amount of feed water required for a good economical engine is 30 pounds per indicated horse power per hour; engines of high economy will use less than this amount, and those more wasteful will use more. A high piston speed, together with a high rotative speed, is very desirable as great power may thus be obtained from moderate sized engines, and also the evil of internal condensation is corrected to a great extent, but these are somewhat limited by practical considerations.

A good condenser increases the economical efficiency of an engine from 25 to 40 per centum, and the amount of injection water required is about 25 times the quantity fed into the boilers.

To Find the Horse Power of Steam Engines

Multiply the area of the piston in inches by the average steam pressure throughout the stroke, then multiply by the number of feet of piston travel per minute; then divide this product by 33,000 which will give the nominal horse power, when a proper allowance for friction has been deducted.

Rules for Estimating Power of Steam Boilers

First.—Shell Boiler. 10 feet of heating surface will produce one horse power. The heating surface is two thirds the surface of the cylinder, and is obtained by multiplying the length by two thirds of the circumference.

Second.—Flue Boiler. 12 feet of heating surface will produce 1 horse power. The heating surface is two thirds the surface of the cylinder; also the entire surface of all the flues.

Third.—Tubular Boiler. 15 feet of heating surface will produce 1 horse power. The heating surface is two thirds the surface of the cylinder; also the entire surface of all the tubes.

1 nominal horse power will require 1 cubic foot of water per hour. 1 cubic foot of water contains 7½ gallons.

Management and Care of Steam Boilers

1. Condition of Water.—The first duty of an engineer when he enters his boiler room in the morning, is to ascertain how many gauges of water there are in his boilers. Never unbank or replenish the fires until this is done. Accidents have occurred, and many boilers have been entirely ruined from neglect of this precaution.

2. Low Water.—In case of low water, immediately cover the fires with ashes, or, if no ashes are at hand, use fresh coal. Don't turn on the feed under any circumstances, nor tamper with, or open the safety valve. Let the steam outlets remain as they are.

3. Foaming.—Close throttle, and keep closed long enough to show true level of water. If that level is sufficiently high, feeding and blowing will usually suffice to correct the evil. In cases of violent foaming, caused by dirty water, or change from salt to fresh, or vice versa, in addition to the action above stated, check draft and cover fires with fresh coal.

4. Leaks.—When leaks are discovered they should be repaired as soon as possible

5. Blowing Off.—Blow down, under a pressure not exceeding 20 pounds, at least once in two weeks; every Saturday night would be better. In case the feed becomes muddy, blow out 6 or 8 inches every day. Where surface blow cocks are used, they should be often opened for a few moments at a time.

6. Filling the Boiler.—After blowing down allow the boiler to become cool before filling again. Cold water pumped into hot boilers is very injurious from sudden contraction.

7. Exterior of Boiler.—Care should be taken that no water comes in contact with the exterior of the boiler, either from leaky joints of other causes.

8. Removing Deposit and Sediment.—In tubular boilers the hand hole should be often opened, and all collections removed from over the fire. Also, when boilers are fed in front, and blown off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

9. Safety Valves.—Raise the safety valves cautiously and frequently, as they are liable to become fast in their seats, and useless for the purpose intended. Should the gauge at any time indicate the limit of pressure allowed, see that the safety valves are blowing off.

10. Gauge Cocks.—Glass Gauge.—Keep gauge cocks clear and in constant use. Glass gauges should not be relied upon altogether.

11. Blisters.—When a blister appears there must be no delay in having it carefully examined and trimmed or patched, as the case may require.

12. Clean Sheets.—Particular care should be taken to keep sheets and parts of boiler exposed to the fire perfectly clean; also all tubes, flues, and connections well swept. This is particularly necessary where wood or soft coil is used for fuel.

13. General Care of Boilers and Connections.—Under all circumstances keep the gauges, cocks, etc., clean and in good order, and things generally in and about the engine and boiler room in a neat condition.

Effective Pressure of Steam on Piston

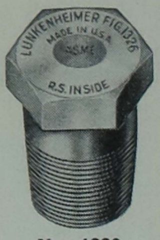
With different rates of expansion, boiler pressure 100 pounds.

Steam cut-off at ¾ stroke=90 pounds effective pressure.
“ “ “ ⅔ “ =80 “ “ “
“ “ “ ½ “ =69 “ ‘ “
“ “ “ ⅓ “ =50 “ “ “
“ “ “ ¼ “ =40 “ “ “

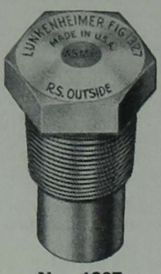
Lunkenheimer Fusible Plugs

Lunkenheimer Fusible Plugs are made of bronze and are filled with pure Banca Tin. The exceptionally long taper fits not only standard pipe-threaded holes, but also holes that have been tapped oversize.

Nos. 1326 and 1327—Regular Standard Pattern


LUNKENHEIMER FIG. 1326
MADE IN U.S.A.
ASME
R.S. INSIDE

No. 1326
Inside Type
Water Side


LUNKENHEIMER FIG. 1327
MADE IN U.S.A.
ASME
R.S. OUTSIDE

No. 1327
Outside Type
Fire Side

These Regular Standard Fusible Plugs conform to the A.S.M.E. Boiler Construction Code.

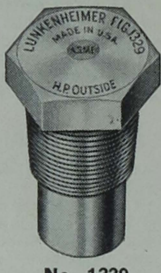
For use on stationary and portable boilers at pressures up to 175 pounds.

Size............inches	½	¾	1	1¼	1½
No. **1326**.........each	**$1.60**	**$2.00**	**$2.75**	**$4.25**	**$6.00**
No. **1327**.........each	**1.70**	**2.20**	**3.00**	**4.75**	**7.00**

Nos. 1328 and 1329—High Pressure Pattern

LUNKENHEIMER FIG. 1328
MADE IN U.S.A.
ASME
H.P. INSIDE

No. 1328
Inside Type
Water Side


LUNKENHEIMER FIG. 1329
MADE IN U.S.A.
ASME
H.P. OUTSIDE

No. 1329
Outside Type
Fire Side

These High Pressure Fusible Plugs conform to the A.S. M.E. Boiler Construction Code.

For use on stationary and portable boilers. No. 1328, ⅜ and ½-inch sizes, and No. 1329, ½-inch size, are suitable for all pressures where plugs are inserted in boiler tubes; ½ to 1½-inch sizes, inclusive may be used in other locations where pressure exceeds 175 pounds.

Size..........inches	⅜	½	¾	1	1¼	1½
No. **1328**........each	**$1.40**	**$1.60**	**$2.00**	**$2.75**	**$4.25**	**$6.00**
No. **1329**........each	....	**1.70**	**2.20**	**3.00**	**4.75**	**7.00**

Nos. 1888 and 1889—Marine Service Pattern

LUNKENHEIMER FIG. 1888
MADE IN U.S.A.
156
M.S. WATER SIDE

No. 1888
Inside Type
Water Side

LUNKENHEIMER FIG. 1889
MADE IN U.S.A.
M.S. FIRE SIDE

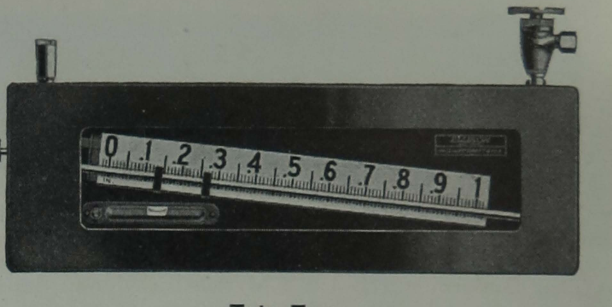
No. 1889
Outside Type
Fire Side

These Marine Service Fusible Plugs are approved by the Bureau of Marine Inspection and Navigation, Department of Commerce.

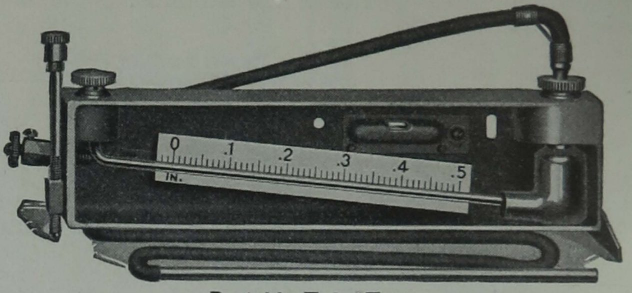
Each plug has a heat number stamped on the end of the fusible core, which signifies that samples of the heat have been submitted to the Department of Commerce for test and have been approved. No plugs of any heat are released for sale until the Department reports its approval of samples from the heat.

Size...................inches	⅜	½	¾	1
No. **1888**................each	**$1.65**	**$1.85**	**$2.30**	**$2.75**
No. **1889**................each	....	**2.75**	**3.70**	**4.50**

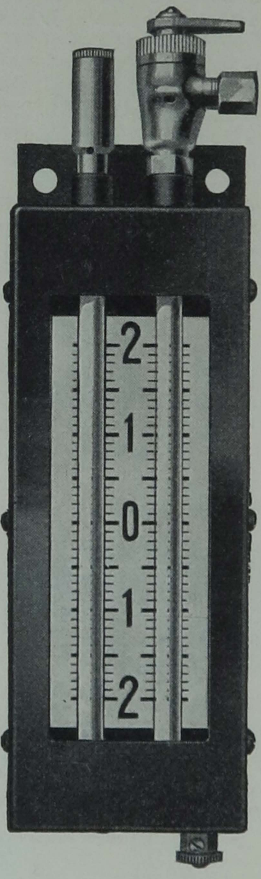
Ellison Draft Gauges


0 1 2 3 4 5 6 7 8 9 1
IN.

Tube Type



Portable Tube Type



U Type

Intended for stationary use. There is an Ellison Draft Gauge of 1, 2, 3, and 4 tubes, for every draft, suction, pressure or differential.

Scales are white enameled with heavy black graduations of exceptional visibility. The red oil, against the white background, can be seen at great distances.

Mineral oil is used for the indicating liquid, specific gravity basis .834 at 60° F., 38° B. Water must not be used. Kerosene is the best temporary substitute.

Pointer type gauges are also available.

Complete information and prices on request.

Single Tube for Wall Mounting

Scale Length Inches	Each	Range Inches
5	**$18.40**	+.10–.40
5	**18.40**	+.20–.30
5	**18.40**	½
5	**18.40**	1
10	**20.00**	+.10–.90
10	**20.00**	+.35–.65
10	**20.00**	1
10	**20.80**	+.10–1.40
10	**20.80**	1½
10	**21.60**	2
10	**22.40**	3
15	**24.00**	+.10–1.40

Larger sizes quoted on request.

U-Type—Single Tube for Wall Mounting

Range..........in.	4	6	8	12	16	20
Each.............	**$6.25**	**7.25**	**8.25**	**10.25**	**12.25**	**14.25**

Portable

With 5-inch scale, 12 feet of rubber tubing, tripod, accessory cup, and oil.

Range, 0 to .5 inch in .01.

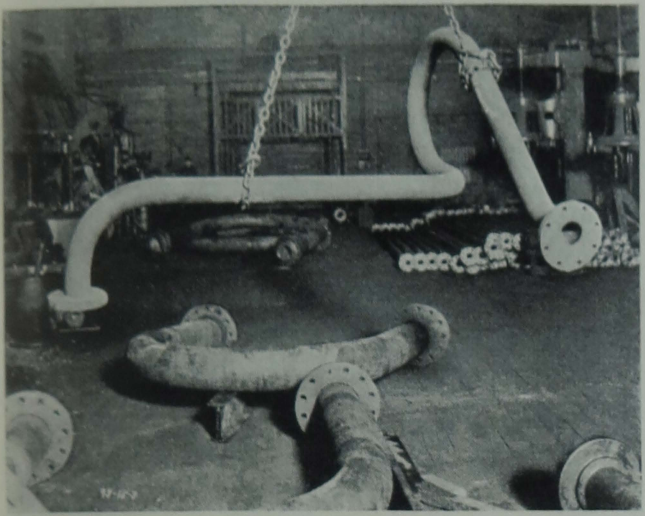
Each.. **$26.00**

Draft Gauge Oil

For use in the above gauges. Red color.

Per Pint..	**$1.00**
Per Quart..	**1.50**

FITTING AND PIPE FABRICATING



Bring your fitting and pipe fabricating problems to us. Whether they are large or small, intricate or simple, for whatever the purpose or pressure, we place at your disposal the services of experienced engineers and the entire facilities of Geo. B. Limbert & Company.

We will make "take-offs" from the prints of your piping layouts covering either new installations or the remodeling of your present plant, and submit quotations on the complete layout, either F.O.B. your plant or on an installed basis.

All sections of a fabricated layout are fitted in the shop to insure exact fit and alignment in the field. Each section is then marked so that the assembly in the field is simplified.

Pipe Cutting and Fitting

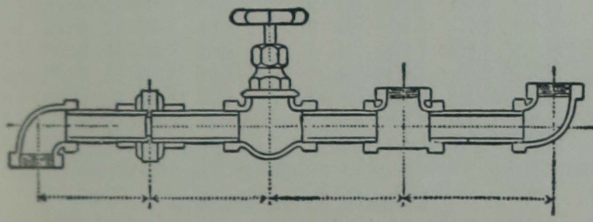


Diagram Showing Screwed Valves and Fittings

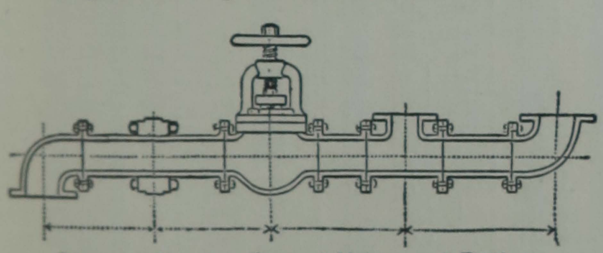


Diagram Showing Flanged Valves and Fittings

We are in a position to furnish quickly pipe cutting, threading and fitting all sizes of pipe to order.

In laying out work of this kind, great care should be taken in making sketches. All measurements should be given center to center as shown in diagrams. It is also necessary to know for what purpose the pipe is to be used and pressure required to stand.

If flanged fittings are to be used state if desired drilled and if with bolts and gaskets complete. Flanges, flanged fittings and valves are drilled in multiples of four, so that they may be made to place in any quarter and bolts straddle the center line. It is always advisable to send templates when drilling of valves or fittings is required.

Prices upon application.

Youngstown Copperoid Pipe

The word Copperoid is registered by the Youngstown Sheet and Tube Company as a trademark for its copper steel products.

Investigations have shown the success of Copperoid Steel when subjected to such corrosive agencies as aqueous solutions of sulphuric acid, vapors of sulphur and steam in sulphur mines, water containing hydrogen sulphite, coal mine water, complex mixtures of hot water, steam and vapors of organic acids, such as pyroligneous acid and pine oil at 250 degrees F., and acid conditions in general, whether organic or mineral, soil or water.

Available in both black and galvanized and sizes as follows:

Buttweld—⅛ to 3-inch inclusive.
Lapweld—1½ to 20-inch, o.d.
Electric weld—7 to 26-inch o.d.
Seamless—½ to 13⅜-inch o.d.

The buttweld sizes are identified by a red coupling and the word Copperoid is rolled into the pipe for its entire length at intervals of about 3 feet. Lapweld, electric weld and seamless are also marked for identification.

Youngstown Yoloy Pipe

Designed for unusually severe conditions. Manufactured from a nickel-copper alloy steel of the proper chemical requirements to withstand the more corrosive elements. Yoloy is a finer grained material due to the influences of both nickel and copper, which elements do not alloy with carbon, thus forming no compounds which are detrimental to corrosion resistance.

Standard sizes furnished in seamless material, thereby assuring greater strength and avoidance of corrosion at the weld, which is common in ordinary grades of furnace-welded tubes.

Actual service and laboratory tests have proven the superiority of Yoloy under many conditions, among some of which are the following: Wetting by salt solution and drying, milk spray, exposure in sulphurous and hot steam atmospheres, brine spray, sludge lines, and atmospheric.

Made in the following sizes:

Seamless—½-inch i.d. to 13⅜-inch o.d.
Electricweld—7 to 26-inch o.d.
(See pages 62, 63 and 64.)

Samples for test purposes will be furnished upon request.

Youngstown Seamless Pipe

This is a pipe with entire absence of any weld, thereby lending itself to greater strength and avoidance of corrosion at the seam which is common in welded types of tubes. It is pierced from solid steel billets, and is of accurate wall thickness. Can be furnished in Yoloy and Copperoid steels, in various tensile strengths, commercial wall thickness and lengths to suit requirements.

Manufactured in various sizes and types as follows:

Line pipe T. & C.—½ to 12-inch inclusive.
Standard pipe T. & C.—½ to 12-inch inclusive.
Extra and double extra heavy, P.E., ½ to 12-inch inclusive.
Plain end o.d. pipe, 3½ to 13⅜-inch o.d. inclusive.
(See pages 62, 63 and 64.)

Youngstown Electric Weld Pipe

By the use of electric energy alone, the edges only of the formed plate are accurately heated to the required welding temperature and immediately forced together by welding rolls. It is manufactured from an open hearth steel made by a special process, producing a sound steel, free of voids, and does not involve the addition of foreign metal for welding purposes.

This pipe is ideal for water, gas, or oil lines from standpoint of installation, cost and service.

Suitable for any type of joint or coupling, and gives maximum flow under all conditions.

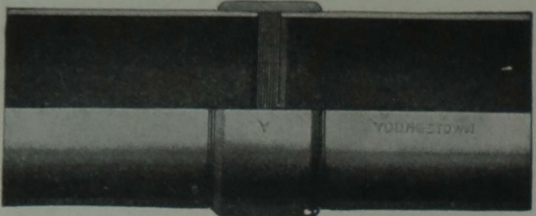
Made of steel conforming to A.P.I. specifications with a minimum ultimate tensile strength of 60000 pounds, elastic limit of 35000 pounds and elongation of 25 per cent in 2 inches. Can be furnished in different factors, however, to suit requirements. Furnished to extra long average lengths, without circumferential weld.

Available in any standard size from 7 to 26 inches o.d. (See pages 63 and 64.)

Youngstown Standard Weight Pipe

Black and Galvanized

All Threads Taper ¾-Inch Per Foot



Standard pipe is known and spoken of by its nominal inside diameter from ⅛ to 12 inches inclusive; above 12-inch diameter, by its outside diameter, and when ordering, thickness desired must be specified.

Different weights of pipe of the same nominal size have the same outside diameter, the extra thickness always being on the inside. All weights given in the table are for black pipe and couplings. Galvanized pipe and couplings are slightly heavier. The weight per foot of pipe with couplings is based on a length of 20 feet. Random length pipe may average over or under 20 feet.

For pipe smoothed on the inside, known as reamed and drifted, an extra charge will be made above standard pipe.

For galvanized, or coated pipe, an extra charge will be made above black.

On orders calling for commercial sizes of pipe which are finished with threads and couplings, in sizes ⅛ to 12-inch, inclusive, and where orders specify quantity in linear feet, it is understood that random lengths fitted with threads both ends and coupling one end will be supplied and the measurement is charged from end to end, that is over all, including coupling.

If cut lengths of any sizes are ordered, instructions must appear on the face of the order whether plain ends, threads only or threads and couplings are required.

The name Youngstown is rolled into the pipe.

Nominal Size In.	Wt., Lbs. per Ft. Thd. & Cplg.	Wt., Lbs. per Ft. Plain Ends	Diameter Inches External	Diameter Inches Internal	Thickness In.	Thds. per In.	Test Press. Lbs. per Sq. In. Butt Weld	Test Press. Lbs. per Sq. In. Lap Weld	Couplings Nom. O.D. In.	Couplings Lgth. In.	Per Foot
⅛	.245	.244	.405	.269	.068	27	700	....	.562	⅞	**$.05½**
¼	.425	.424	.540	.364	.088	18	700	....	.685	1	**.06**
⅜	.568	.567	.675	.493	.091	18	700	....	.848	1⅛	**.06**
½	.852	.850	.840	.622	.109	14	700	....	1.024	1⅜	**.08½**
¾	1.134	1.130	1.050	.824	.113	14	700	....	1.281	1⅝	**.11½**
1	1.684	1.678	1.315	1.049	.133	11½	700	....	1.576	1⅞	**.17**
1¼	2.281	2.272	1.660	1.380	.140	11½	700	1000	1.950	2⅛	**.23**
1½	2.731	2.717	1.900	1.610	.145	11½	700	1000	2.218	2⅜	**.27½**
2	3.678	3.652	2.375	2.067	.154	11½	700	1000	2.760	2⅝	**.37**
2½	5.819	5.793	2.875	2.469	.203	8	800	1000	3.276	2⅞	**.58½**
3	7.616	7.575	3.500	3.068	.216	8	800	1000	3.948	3⅛	**.76½**
3½	9.202	9.109	4.000	3.548	.226	8	...	1000	4.591	3⅝	**.92**
4	10.889	10.790	4.500	4.026	.237	8	...	1000	5.091	3⅝	**1.09**
* **4½**	12.642	12.538	5.000	4.506	.247	8	...	1000	5.591	3⅝	**1.27**
5	14.810	14.617	5.563	5.047	.258	8	...	1000	6.296	4⅛	**1.48**
6	19.185	18.974	6.625	6.065	.280	8	...	1000	7.358	4⅛	**1.92**
* **7**	23.769	23.544	7.625	7.023	.301	8	...	1000	8.358	4⅛	**2.38**
8	25.000	24.696	8.625	8.071	.277	8	...	800	9.420	4⅝	**2.50**
8	28.809	28.554	8.625	7.981	.322	8	...	1000	9.420	4⅝	**2.88**
* **9**	34.188	33.907	9.625	8.941	.342	8	...	900	10.420	5⅛	**3.45**
10	32.000	31.201	10.750	10.192	.279	8	...	600	11.721	6⅛	**3.20**
10	35.000	34.240	10.750	10.136	.307	8	...	800	11.721	6⅛	**3.50**
10	41.132	40.483	10.750	10.020	.365	8	...	900	11.721	6⅛	**4.12**
11	46.247	45.557	11.750	11.000	.375	8	...	800	12.721	6⅛	**4.63**
12	45.000	43.773	12.750	12.090	.330	8	...	600	13.958	6⅛	**4.50**
12	50.706	49.562	12.750	12.000	.375	8	...	800	13.958	6⅛	**5.07**

*Not commonly used. Their manufacture as regular stock was ordered to be discontinued September 1, 1927.

Weight and dimensions are nominal.

Permissible variation in weight, 5% above and 5% below.

Furnished with threads and couplings and in random lengths unless otherwise ordered. Seamless pipe in standard sizes and weights in 2⅜-inch o.d. and larger also available.

Bundling Table

Size In.	Pcs. per Bdle.	Feet per Bdle.	Wt., Lbs. per Bdle.	Size In.	Pcs. per Bdle.	Feet per Bdle.	Wt., Lbs. per Bdle
⅛	25 to 32	538	132	¾	7	150	170
¼	24	459	195	1	5	106	180
⅜	18	355	202	1¼	3	65	148
½	12	258	219	1½	3	64	175

Youngstown Extra Strong and Double Extra Strong Pipe

Black and Galvanized

All Threads Taper ¾-Inch Per Foot

Furnished with plain ends and in random lengths unless otherwise ordered.

Random length of extra strong and double extra strong pipe is considered to be 12 feet to 22 feet, we to have the privilege, however, of supplying not exceeding 5 per cent of total order in lengths from 6 to 12 feet, unless order specifies otherwise.

For pipe fitted with threads and couplings, an extra charge will be made above plain ends.

For cut lengths, an extra charge will be made above random.

For galvanized, or coated pipe, an extra charge will be made above black.

In addition to sizes and weights listed, seamless pipe can be furnished in standard sizes and weights in 2⅜-inch outside diameter and larger.

All weights and dimensions are nominal.

Extra Strong

Nom. Size In.	Wt., Lbs. per Ft., Plain Ends.	Diameters Inches External	Diameters Inches Internal	Thick. In.	Thrds. per In.	Test Press. Lbs. per Sq. In. Butt-Weld	Test Press. Lbs. per Sq. In. Lap-Weld	Couplings Diam. In.	Couplings Lgth. In.	Couplings Wt. Lbs.	Per Foot
⅛	.314	.405	.215	.095	27	700	....	.582	1⅛	.045	**$.12**
¼	.535	.540	.302	.119	18	700	....	.724	1⅜	.073	**.07½**
⅜	.738	.675	.423	.126	18	700	....	.898	1⅝	.133	**.07½**
½	1.087	.840	.546	.147	14	700	....	1.085	1⅞	.218	**.11**
¾	1.473	1.050	.742	.154	14	700	....	1.316	2⅛	.334	**.15**
1	2.171	1.315	.957	.179	11½	700	....	1.575	2⅜	.470	**.22**
1¼	2.996	1.660	1.278	.191	11½	1500	2500	2.054	2⅞	1.036	**.30**
1½	3.631	1.900	1.500	.200	11½	1500	2500	2.294	2⅞	1.170	**.36½**
2	5.022	2.375	1.939	.218	11½	1500	2500	2.870	3⅝	2.174	**.50½**
2½	7.661	2.875	2.323	.276	8	1500	2000	3.389	4⅛	3.433	**.77**
3	10.252	3.500	2.900	.300	8	....	2000	4.014	4⅛	4.131	**1.03**
3½	12.505	4.000	3.364	.318	8	....	2000	4.628	4⅝	6.289	**1.25**
4	14.983	4.500	3.826	.337	8	....	2000	5.216	4⅝	8.155	**1.50**
***4½**	17.611	5.000	4.290	.355	8	....	1800	5.733	4⅝	9.003	**1.80**
5	20.778	5.563	4.813	.375	8	....	1800	6.420	5⅛	12.870	**2.08**
6	28.573	6.625	5.761	.432	8	....	1800	7.482	5⅛	15.176	**2.86**
***7**	38.048	7.625	6.625	.500	8	....	1500	8.482	5⅛	17.348	**3.81**
8	43.388	8.625	7.625	.500	8	....	1500	9.593	6⅛	26.626	**4.34**
***9**	48.728	9.625	8.625	.500	8	....	1500	10.596	6⅛	29.574	**4.90**
10	54.735	10.750	9.750	.500	8	....	1200	11.958	6⅝	44.156	**5.48**
***11**	60.075	11.750	10.750	.500	8	....	1100	12.958	6⅝	48.074	**6.10**
12	65.415	12.750	11.750	.500	8	....	1100	13.958	6⅝	51.991	**6.55**

Permissible variation in weight is 5% above and below.

Double Extra Strong

Nom. Size In.	Wt., Lbs. per Ft., Plain Ends.	Diameters Inches External	Diameters Inches Internal	Thick. In.	Thrds. per In.	Test Press. Lbs. per Sq. In. Butt-Weld	Test Press. Lbs. per Sq. In. Lap-Weld	Couplings Diam. In.	Couplings Lgth. In.	Couplings Wt. Lbs.	Per Foot
½	1.714	.840	.252	.294	14	700	....	1.085	1⅞	.218	**$.32**
¾	2.440	1.050	.434	.308	14	700	....	1.316	2⅛	.334	**.35**
1	3.659	1.315	.599	.358	11½	700	....	1.575	2⅜	.470	**.37**
1¼	5.214	1.660	.896	.382	11½	2200	....	2.054	2⅞	1.036	**.52½**
1½	6.408	1.900	1.100	.400	11½	2200	....	2.294	2⅞	1.170	**.65**
2	9.029	2.375	1.503	.436	11½	2200	....	2.870	3⅝	2.174	**.91**
2½	13.695	2.875	1.771	.552	8	2200	....	3.389	4⅛	3.433	**1.37**
3	18.583	3.500	2.300	.600	8	2200	....	4.014	4⅛	4.131	**1.86**
3½	22.850	4.000	2.728	.636	8	....	2500	4.628	4⅝	6.289	**2.30**
4	27.541	4.500	3.152	.674	8	....	2500	5.216	4⅝	8.155	**2.76**
5	38.552	5.563	4.063	.750	8	....	2000	6.420	5⅛	12.870	**3.86**
6	53.160	6.625	4.897	.864	8	....	2000	7.482	5⅛	15.176	**5.32**
***7**	63.079	7.625	5.875	.875	8	....	2000	8.482	5⅛	17.348	**6.35**
8	72.424	8.625	6.875	.875	8	....	2000	9.593	6⅛	26.626	**7.25**

Permissible variation in weight is 10% above and below.

*These sizes are not commonly used. Their manufacture as regular stock sizes was ordered discontinued Sept. 1, 1937.

Bundling Table for Extra Strong Pipe

Size In.	No. of Pcs. per Bdle.	Approx. Ft. per Bdle.	Approx. Wt. Lbs. per Bdle.	Size In.	No. of Pcs. per Bdle.	Approx. Ft. per Bdle.	Approx. Wt., Lbs. per Bdle.
⅛	25 to 32	550	173	¾	7	150	221
¼	24	465	249	1	5	106	232
⅜	18	360	266	1¼	3	65	195
½	12	258	280	1½	3	64	232

Bundling Table for Double Extra Strong Pipe

Size In.	No. of Pcs. per Bdle.	Approx. Ft. per Bdle.	Approx. Wt. Lbs. per Bdle.	Size In.	No. of Pcs. per Bdle.	Approx. Ft. per Bdle.	Approx. Wt., Lbs. per Bdle.
½	7	140	240	1¼	3	60	313
¾	5	100	244	1½	3	60	384
1	3	60	220	...	.	...	...

Youngstown Plain End Pipe

For Water, Gas and Oil Lines

Ends Finished for Specified Couplings or Welded Joints

These tables are intended for the determination of sizes and thicknesses for long lines. They include all sizes listed in American Petroleum Institute Line Pipe Specification No. 5-L issued August, 1935, and also other sizes and thicknesses, some of which are special. It may not always be possible to manufacture these special sizes, particularly in small quantities.

The permissible variation in weight for all plain end pipe for gas and oil lines is in accordance with API specifications.

The tables shown have an asterisk in the weight per foot column preceding the weight which indicates that the weight is a present API listed standard. Also in the weight per foot column, following the listed weight per foot for the various sizes of plain end pipe, there is shown the letter X or Y, which designates the sizes and thicknesses of plain end pipe generally being used in the field.

1st—Weights most commonly used (indicated by letter X).

2nd—Weights of uncommon sizes that may be furnished (indicated by the letter Y).

Barlow's formula, with a safety factor of 4, was used in calculating the listed working pressures that are given for lap-weld, Grade A and Grade B seamless line pipe. To obtain the working pressure for other factors of safety, multiply the pressure shown by 4, and divide by the safety factor desired.

Most of the popular sizes from 6⅝ to 26-inch o.d. can be furnished in ELECTRIC WELD PIPE also. Electric Weld Pipe is generally furnished in API Grade B, and the details as to size, weight, thickness, test pressures and working pressure coincide with those given for Grade B seamless pipe in the following tables.

All weights and dimensions are nominal.

Size O.D. In.	Weight per Foot Pounds	Thickness Inches		Test Press Lbs. Per Sq. In.		Work. Press. (Safety Factor 4) Lbs. Per Sq. In.	
		Decimal	Fraction	Lap-Weld and Seamless Grade A	Seamless Grade B	Lap-Weld and Seamless Grade A	Seamless Grade B
3½	*4.50 X	.125	⅛	1100	1200	893	1071
3½	*5.29 X	.148	⅛	1300	1400	1057	1269
3½	*6.63 X	.1875	3/16	1600	1800	1339	1607
3½	*7.57 X	.216	3/16	1900	2100	1543	1851
3½	*8.38 X	.241	3/16	2100	2300	1721	2066
3½	8.67 X	.250	¼	2100	2400	1786	2143
3½	*8.80 X	.254	¼	2200	2500	1814	2177
3½	9.66 X	.28125	9/32	2400	2500	2009	2411
3½	*9.91 X	.289	9/32	2500	2500	2064	2477
3½	*10.25 X	.300	9/32	2500	2500	2143	2571
4	*5.29 Y	.128	9/32	950	1100	800	960
4	*5.53 Y	.134	9/32	1000	1100	838	1005
4	*6.08 Y	.148	9/32	1100	1300	925	1110
4	*7.63 Y	.1875	3/16	1400	1600	1172	1406
4	*9.10 Y	.226	3/16	1700	1900	1413	1695
4	12.50 Y	.318	3/16	2400	2500	1988	2385
4½	*5.97 X	.128	3/16	850	950	711	853
4½	*6.60 X	.142	3/16	950	1100	789	947
4½	*7.63 X	.165	3/16	1100	1200	917	1100
4½	*8.63 X	.1875	3/16	1300	1400	1042	1250
4½	*9.40 X	.205	3/16	1400	1500	1139	1367
4½	10.00 X	.21875	7/32	1500	1700	1215	1458
4½	*10.79 X	.237	7/32	1600	1800	1317	1580
4½	*11.34 X	.250	¼	1700	1900	1389	1667
4½	*12.24 X	.271	¼	1800	2000	1506	1807
4½	12.67 X	.28125	9/32	1900	2100	1563	1875
4½	*13.97 X	.3125	5/16	2100	2400	1736	2083
4½	14.98 X	.337	5/16	2200	2500	1872	2247
5	6.96 Y	.134	5/16	800	900	670	804
5	8.52 Y	.165	5/16	1000	1100	825	990

*Indicates present A.P.I. Listed Standard.

Youngstown Plain End Pipe

For Water, Gas and Oil Lines

Ends Finished for Specified Couplings or Welded Joints
Continued

All weights and dimensions are nominal.

Size O.D. In.	Weight per Foot Pounds	Thickness Inches		Test Press. Lbs. Per Sq. In.		Work. Press. (Safety Factor 4) Lbs. Per Sq. In.	
		Decimal	Fraction	Lap-Weld and Seamless Grade A	Seamless Grade B	Lap-Weld and Seamless Grade A	Seamless Grade B
5	9.63 Y	.1875	3/16	1100	1300	938	1125
5	11.17 Y	.21875	7/32	1300	1500	1094	1313
5	12.53 Y	.247	7/32	1500	1700	1235	1482
5	15.64 Y	.3125	5/16	1900	2100	1563	1875
5	17.61 Y	.355	5/16	2100	2400	1775	2130
5 9/16	8.55 X	.148	5/16	800	900	665	798
5 9/16	10.76 X	.1875	3/16	1000	1100	843	1011
5 9/16	12.48 X	.21875	7/32	1200	1300	983	1180
5 9/16	14.18 X	.250	¼	1300	1500	1123	1348
5 9/16	14.61 X	.258	¼	1400	1600	1159	1391
5 9/16	15.86 X	.28125	9/32	1500	1700	1264	1517
5 9/16	17.52 X	.3125	5/16	1700	1900	1404	1685
5 9/16	19.16 X	.34375	11/32	1900	2100	1545	1854
5 9/16	20.77 X	.375	⅜	200	2300	1685	2022
6	8.76 Y	.140	⅜	700	800	583	700
6	10.22 Y	.164	5/32	800	950	683	820
6	11.63 Y	.1875	3/16	950	1100	781	938
6	13.50 Y	.21875	7/32	1100	1200	911	1094
6	15.35 Y	.250	¼	1300	1400	1042	1250
6	18.98 Y	.3125	5/16	1600	1800	1302	1563
6⅝	9.96 X	.144	5/16	650	750	543	652
6⅝	*11.65 X	.169	5/16	750	850	638	765
6⅝	*12.39 X	.180	5/16	800	900	679	815
6⅝	*12.89 X	.1875	3/16	850	950	708	849
6⅝	*14.96 X	.21875	7/32	1000	1100	825	991
6⅝	*15.90 X	.233	7/32	1100	1200	879	1055
6⅝	*17.02 X	.250	¼	1100	1300	943	1132
6⅝	*18.97 X	.280	¼	1300	1400	1057	1268
6⅝	21.06 X	.3125	5/16	1400	1600	1179	1415
6⅝	23.06 X	.343375	11/32	1600	1800	1297	1556
6⅝	25.03 X	.375	⅜	1700	1900	1415	1698
6⅝	26.98 X	.40625	13/32	1800	2100	1533	1840
6⅝	*28.57 X	.432	13/32	2000	2200	1630	1956
7	10.90 Y	.149	13/32	650	700	532	639
7	12.68 Y	.174	5/32	750	850	621	746
7	13.64 Y	.1875	3/16	800	900	670	804
7	15.84 Y	.21875	7/32	950	1100	781	938
7	16.69 Y	.231	7/32	1000	1100	825	990
7	18.02 Y	.250	¼	1100	1200	893	1071
7	19.75 Y	.275	¼	1200	1300	982	1179
7	20.18 Y	.28125	9/32	1200	1400	1004	1205
7	22.31 Y	.3125	5/16	1300	1500	1116	1339
7	23.64 Y	.332	5/16	1400	1600	1186	1423
8	13.23 Y	.158	⅜	600	650	494	593
8	*13.80 Y	.165	⅜	600	700	516	619
8	*15.64 Y	.1875	3/16	700	800	586	703
8	*18.17 Y	.21875	7/32	800	950	684	820
8	*20.69 Y	.250	¼	950	1100	781	938
8	*23.18 Y	.28125	9/32	1100	1200	879	1055
8	25.65 Y	.3125	5/16	1200	1300	977	1172
8⅝	*14.90 X	.165	⅜	550	650	478	574
8⅝	*16.89 X	.1875	3/16	650	750	543	652
8⅝	*19.63 X	.21875	7/32	750	850	634	761
8⅝	*22.36 X	.250	¼	850	1000	725	870
8⅝	*23.57 X	.264	¼	900	1000	765	918
8⅝	*24.69 X	.277	¼	950	1100	803	963
8⅝	25.06 X	.28125	9/32	1000	1100	815	978
8⅝	27.74 X	.3125	5/16	1100	1200	906	1087
8⅝	*28.55 X	.322	5/16	1100	1300	933	1120
8⅝	30.40 X	.34375	11/32	1200	1400	996	1196
8⅝	33.04 X	.375	⅜	1300	1500	1087	1304
8⅝	35.65 X	.40625	13/32	1400	1600	1178	1413
8⅝	38.25 X	.4375	7/16	1500	1700	1268	1522

*Indicates present A.P.I. Listed Standard.

Youngstown Plain End Pipe

For Water, Gas and Oil Lines

Ends Finished for Specified Couplings or Welded Joints Continued

All weight and dimensions are nominal.

Size O.D. In.	Weight per Foot Pounds	Thickness Inches Decimal	Thickness Inches Fraction	Test Press. Lbs. per Sq. In. Lap-Weld and Seamless Grade A	Test Press. Lbs. per Sq. In. Seamless Grade B	Work. Press. (Safety Factor 4) Lbs. per Sq. In. Lap-Weld and Seamless Grade A	Work. Press. (Safety Factor 4) Lbs. per Sq. In. Seamless Grade B
8 5/8	40.83 X	.46875	15/32	1600	1800	1359	1630
8 5/8	*43.38 X	.500	1/2	1700	2000	1449	1739
9	15.75 Y	.167	1/2	500	650	464	557
9	17.64 Y	.1875	3/16	650	700	521	625
9	20.51 Y	.21875	7/32	750	850	608	729
9	23.36 Y	.250	1/4	850	950	694	833
9	26.18 Y	.28125	9/32	950	1100	781	938
9	28.99 Y	.3125	5/16	1000	1200	868	1042
10	18.36 Y	.175	1/2	550	600	438	525
10	*19.64 Y	.1875	3/16	550	650	469	563
10	*21.75 Y	.208	3/16	600	700	520	624
10	*22.85 Y	.21875	7/32	650	750	547	656
10	*26.03 Y	.250	1/4	750	850	625	750
10	*29.19 Y	.28125	9/32	850	950	702	842
10	*32.33 Y	.3125	5/16	950	1100	781	938
10 3/4	20.32 X	.180	1/2	500	550	419	502
10 3/4	*24.60 X	.21875	7/32	600	700	509	610
10 3/4	*28.03 X	.250	1/4	700	800	581	698
10 3/4	*31.20 X	.279	1/4	800	900	649	779
10 3/4	31.44 X	.28125	9/32	800	900	654	785
10 3/4	*34.24 X	.307	9/32	850	950	714	857
10 3/4	34.83 X	.3125	5/16	850	1000	727	872
10 3/4	38.20 X	.34375	11/32	950	1100	799	959
10 3/4	*38.66 X	.348	11/32	950	1100	809	971
10 3/4	*40.48 X	.365	11/32	1000	1200	849	1019
10 3/4	41.55 X	.375	3/8	1000	1200	872	1047
10 3/4	44.87 X	.40625	13/32	1100	1300	945	1134
10 3/4	48.19 X	.4375	7/16	1200	1400	1017	1221
10 3/4	51.47 X	.46875	15/32	1300	1500	1090	1308
10 3/4	*54.73 X	.500	1/2	1400	1600	1163	1395
12	24.46 Y	.194	1/2	500	550	404	485
12	*27.52 Y	.21875	7/32	550	600	456	547
12	*29.89 Y	.238	7/32	600	650	496	595
12	*31.37 Y	.250	1/4	650	700	521	625
12	*35.20 Y	.28125	9/32	700	800	586	703
12	*38.46 Y	.308	9/32	750	850	642	770
12	39.00 Y	.3125	5/16	800	900	651	781
12	*39.91 Y	.320	5/16	800	900	667	800
12	*42.79 Y	.34375	11/32	850	950	716	859
12	46.55 Y	.375	3/8	950	1100	781	938
12 3/4	27.20 X	.203	1/2	500	550	398	478
12 3/4	29.27 X	.21875	7/32	500	600	429	515
12 3/4	*33.37 X	.250	1/4	600	650	490	588
12 3/4	*37.45 X	.28125	9/32	650	750	551	662
12 3/4	*41.51 X	.3125	5/16	750	850	613	735
12 3/4	*43.77 X	.330	5/16	800	900	647	776
12 3/4	*45.54 X	.34375	11/32	800	900	674	809
12 3/4	*49.56 X	.375	3/8	900	1000	735	882
12 3/4	53.55 X	.40625	13/32	950	1100	797	956
12 3/4	*57.53 X	.4375	7/16	1000	1200	858	1029
12 3/4	61.48 X	.46875	15/32	1100	1300	919	1103
12 3/4	*65.41 X	.500	1/2	1200	1300	980	1176
14	30.92 X	.210	1/2	450	500	375	450
14	32.19 X	.21875	7/32	450	550	391	469
14	*36.71 X	.250	1/4	550	600	446	536
14	*41.20 X	.28125	9/32	600	700	502	603
14	*45.68 X	.3125	5/16	650	750	558	670
14	*50.13 X	.34375	11/32	750	850	614	737
14	*54.56 X	.375	3/8	800	900	670	804
14	*58.98 X	.40625	13/32	850	1000	725	871
14	*63.37 X	.4375	7/16	950	1100	781	938
14	*67.74 X	.46875	15/32	1000	1100	837	1004
14	*72.09 X	.500	1/2	1100	1200	893	1071

*Indicates present A.P.I. Listed Standard.

Youngstown Plain End Pipe

For Water, Gas and Oil Lines

Ends Finished for Specified Couplings or Welded Joints Continued

All weights and dimensions are nominal.

Size O.D. In.	Weight per Foot Pounds	Thickness Inches Decimal	Thickness Inches Fraction	Test Press. Lbs. per Sq. In. Lap-Weld and Seamless Grade A	Test Press. Lbs. per Sq. In. Seamless Grade B	Work. Press. (Safety Factor 4) Lbs. per Sq. In. Lap-Weld and Seamless Grade A	Work. Press. (Safety Factor 4) Lbs. per Sq. In. Seamless Grade B
16	39.40 X	.234	9/16	450	500	366	439
16	*42.05 X	.250	1/4	450	550	391	469
16	*47.21 X	.28125	9/32	550	600	439	527
16	*52.35 X	.3125	5/16	600	650	488	586
16	*57.47 X	.34375	11/32	650	750	537	645
16	*62.57 X	.375	3/8	700	800	586	703
16	66.80 X	.401	3/8	750	850	627	752
16	*67.65 X	.40625	13/32	750	850	635	762
16	*72.71 X	.4375	7/16	800	950	684	820
16	*77.75 X	.46875	15/32	900	1000	732	879
16	*82.77 X	.500	1/2	950	1100	781	938
18	46.45 X	.245	9/16	400	450	340	408
18	*47.39 X	.250	1/4	400	450	347	417
18	*53.22 X	.28125	9/32	450	550	391	469
18	*59.03 X	.3125	5/16	500	600	434	521
18	*64.82 X	.34375	11/32	550	650	477	573
18	*70.58 X	.375	3/8	650	700	521	625
18	*76.33 X	.40625	13/32	700	750	564	677
18	*82.06 X	.4375	7/16	750	850	608	729
18	*87.76 X	.46875	15/32	800	900	651	781
18	*93.45 X	.500	1/2	850	950	694	833
20	*52.73 X	.250	1/4	400	450	313	375
20	57.30 X	.272	1/4	400	450	340	408
20	*59.23 X	.28125	9/32	400	500	352	422
20	*65.70 X	.3125	5/16	450	550	391	469
20	*72.16 X	.34375	11/32	500	600	430	516
20	*78.59 X	.375	3/8	550	650	469	563
20	*85.01 X	.40625	13/32	600	700	508	609
20	*91.40 X	.4375	7/16	650	750	547	656
20	*97.77 X	.46875	15/32	700	800	586	703
20	*104.13 X	.500	1/2	750	850	625	750
22	58.07 X	.250	1/4	350	400	284	341
22	65.23 X	.28125	9/32	400	450	320	384
22	*72.38 X	.3125	5/16	450	500	355	426
22	*79.50 X	.34375	11/32	450	550	391	469
22	*86.60 X	.375	3/8	500	600	426	511
22	*93.69 X	.40625	13/32	550	650	462	554
22	*100.75 X	.4375	7/16	600	700	497	597
22	*107.79 X	.46875	15/32	650	700	533	639
22	*114.81 X	.500	1/2	700	750	568	682
24	63.41 X	.250	1/4	300	350	261	313
24	71.24 X	.28125	9/32	350	400	293	352
24	*79.05 X	.3125	5/16	400	450	326	391
24	*86.84 X	.34375	11/32	450	500	358	430
24	*94.61 X	.375	3/8	450	550	391	469
24	*102.36 X	.40625	13/32	500	600	423	508
24	*110.09 X	.4375	7/16	550	600	456	547
24	*117.80 X	.46875	15/32	600	650	488	586
24	*125.49 X	.500	1/2	650	700	521	625
26	68.75 X	.250	1/4	300	350	240	288
26	77.25 X	.28125	9/32	300	350	270	325
26	85.73 X	.3125	5/16	350	400	300	361
26	94.19 X	.34375	11/32	400	450	331	397
26	102.62 X	.375	3/8	450	500	361	433
26	111.04 X	.40625	13/32	450	550	391	469
26	119.44 X	.4375	7/16	500	550	421	505
26	127.81 X	.46875	15/32	550	600	451	541
26	136.17 X	.500	1/2	600	650	481	577

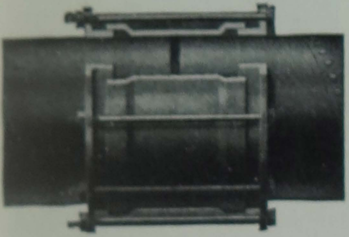
*Indicates present A.P.I. Listed Standard.

The Youngstown Sheet and Tube Co. have published a hand book of Engineering information covering steel pipe, linings, wraps, methods of tapping, etc., pertaining to water flow lines and distribution systems. We will furnish it to interested parties upon request.

A special Youngstown Pipe Catalogue giving complete and detailed information on all types of steel pipe will be furnished on request

Taylor Forge Sleeve Type Couplings

Forged Steel

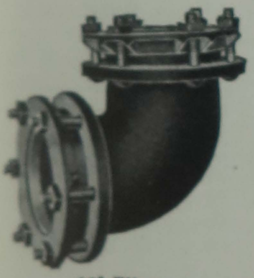


Used to couple water supply lines, blower lines and other lines which contain few changes in direction. Each joint will deflect slightly if required, from 2 to 4 degrees depending upon the pipe size. Expansion is frequently provided for in flanged or welded lines by the insertion of a few of these joints. Complete with bolts and rubber packing.

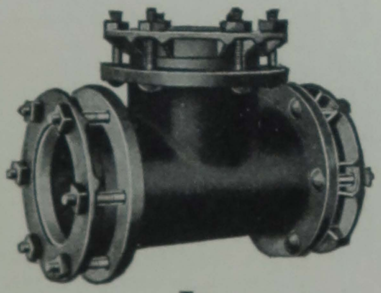
Size In.	Each	Approx. Wt. Each, Lbs.	Size In.	Each	Approx. Wt. Each, Lbs.
*3	$1.75	8	22	$22.50	109
*4	2.15	10	24	24.50	128
*5	2.25	11	26	26.75	139
6	4.25	19	28	29.00	145
8	6.20	26	30	35.50	154
10	7.10	30	32	37.50	175
12	9.25	43	34	39.50	180
14	10.50	54	36	42.00	191
16	15.00	65	38	69.00	260
18	18.75	79	40	73.00	267
20	20.75	101	42	77.00	283

*Cast iron.

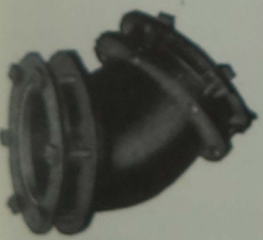
Dayton Pipe Fittings



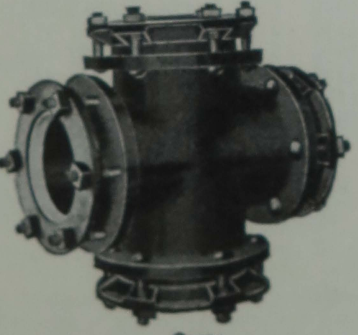
90° Elbow



Tee



45° Elbow

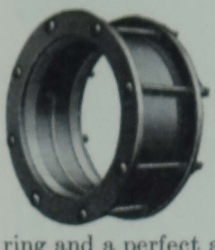


Cross

In addition to the styles shown special pipe fittings of all descriptions and sizes can be furnished. Specifications of special fittings should accompany request for quotations or orders. Prices upon application.

No. 1 Dayton Pipe Couplings

All Steel Regular Couplings



For use on either plain end or threaded pipe. Unaffected by climatic conditions. A protection against leaky pipe lines. Uniformity of pipe clearance and flare receive special attention, assuring a perfect fit for the pipe and providing a seat for the rubber gasket which gives even compression throughout the circle. The degree of bevel on the gasket conforms exactly to the flare of the center ring and a perfect and permanent joint is thus attained.

It is impossible to bend the forged steel flanges no matter how severe the strain, as the heads of the bolts are set over the supporting rib of flange, bringing strain at the strongest point.

Size Inches	O.D. Pipe Inches	Length Centers Inches	Special Head Bolts No.	Special Head Bolts Size, In.	Shipping Weight Pounds
5⅝C	6	¼x5	4	⅝x 8	22
6	6⅝	¼x5	6	⅝x 8	25
6	6⅝	5/16x7	6	⅝x10	31½
6¼C	6⅝	¼x5	6	⅝x 8	25
6¼C	6⅝	5/16x7	6	⅝x10	31½
6⅝C	7	¼x5	6	⅝x 8	26
6⅝C	7	5/16x7	6	⅝x10	33
7⅝C	8	¼x5	6	⅝x 8	28½
7⅝C	8	5/16x7	6	⅝x10	37
8	8⅝	¼x5	6	⅝x 8	30½
8	8⅝	5/16x7	6	⅝x10	37
8¼C	8⅝	¼x5	6	⅝x 8	30½
8¼C	8⅝	5/16x7	6	⅝x10	37
9⅝C	10	¼x5	8	⅝x 8½	43
10	10¾	¼x5	8	⅝x 8½	45½
10	10¾	5/16x7	8	⅝x10½	56½
10¼C	10¾	¼x5	8	⅝x 8½	45½
10¼C	10¾	5/16x7	8	⅝x10½	56½
11⅝C	12	¼x5	8	⅝x 8½	50
11⅝C	12	5/16x7	8	⅝x10½	61
12	12¾	¼x5	8	⅝x 8½	52½
12	12¾	5/16x7	8	⅝x10½	64½
12½C	13	¼x5	8	⅝x 8½	52½
13½C	14	¼x5	10	⅝x 8½	58
13½C	14	5/16x7	10	⅝x10½	72
***14**	14	¼x5	10	⅝x 8½	58
***14**	14	5/16x7	10	⅝x10½	72
14½C	15	5/16x7	10	⅝x10½	76
15½C	16	5/16x7	10	⅝x10½	79
***16**	16	5/16x7	10	⅝x10½	79
***18**	18	5/16x7	10	⅝x10½	97½
***20**	20	5/16x7	12	⅝x10½	110

Couplings with Steel Centers and Malleable Iron Flanges

For plain end and threaded pipe. This coupling is adaptable to sizes 2-inch and smaller. Since it is used on only the smaller sizes of pipe, but two bolts are necessary.

Size In.	O.D. Pipe In.	Lgth. Centers In.	Size Special Head Bolts In.	Ship. Wt. Lbs.
½	.840	5	⅜x6½	2
¾	1.050	5	½x6¾	2¾
1	1.315	5	½x6¾	3¼
1¼	1.660	5	½x6¾	3¾
1½	1.900	5	½x6¾	4¼
2	2.375	5	⅝x7	6¾

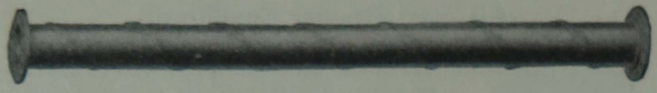
Reducing Couplings

Design is similar to all-steel regular couplings, except that one end is provided for a smaller size pipe. Made on special order only.

*Indicates outside diameter of pipe.

The letter C denotes casing sizes.

Taylor Forge Spiral Pipe



Used extensively for exhaust and vacuum lines, for water lines of all kinds, for material conveying, air piping, and for conveying oil and gas.

Due to continuous spiral reinforcing seam from end to end, this light weight pipe is strong in bursting strength, strength against collapse and longitudinal stiffness.

Sizes: Welded, 4 to 42 inches in diameter; riveted, 3 to 42 inches.

Lengths: Galvanized, 20 feet long or less; asphalted, 40 feet or less.

Thickness: Welded pipe, 14 to 8 gage; riveted pipe, 18 to 6 gage.

Joints: Flanged, with Taylor Forged Steel Flanges; slip joints; flexibly-coupled bolted joints; or with ends of each length prepared for field welded joints or banded and grooved for grooved type couplings.

Coatings: By vertical dipping in hot bath of asphalt and vertical draining; or galvanized in molten zinc by vertical dipping and draining.

Ten-gage thickness fittings for light weight pipe, plain end or flanged. Pipe specials of every description.

Each length is tested by pressure.

Taylor Forge Spiral Pipe

	Riveted			Welded		
Nom. I.D. In.	Plain End Per Ft.	U.S.Std. Gage Thickness	Approx. Bursting Pressure Lbs. per Sq. In.	*Plain End Per Ft.	U.S.Std. Gage Thickness	Approx. Bursting Pressure Lbs. per Sq. In.
3	$.18	18	1666	....	..	....
4	.29	16	1563	$.36	14	1952
5	.36	16	1250	.45	14	1562
5	.45	14	1562	....	..	....
6	.43	16	1047	.54	14	1300
6	.54	14	1300	.76	12	1825
6	.76	12	1825	.97	10	2340
8	.57	16	780	.71	14	975
8	.71	14	975	.99	12	1366
8	.99	12	1366	1.27	10	1757
10	.71	16	625	.89	14	781
10	.89	14	781	1.24	12	1093
10	1.24	12	1093	1.59	10	1406
12	.84	16	521	1.05	14	651
12	1.05	14	651	1.47	12	911
12	1.47	12	911	1.89	10	1172
12	1.89	10	1172	2.30	8	1432
14	.93	16	448	1.16	14	558
14	1.16	14	558	1.62	12	781
14	1.62	12	781	2.08	10	1004
14	2.08	10	1004	2.53	8	1228
14	2.53	8	1228	....	..	....
16	1.06	16	391	1.32	14	488
16	1.32	14	488	1.85	12	683
16	1.85	12	683	2.38	10	879
16	2.38	10	879	2.90	8	1074
16	2.90	8	1074	....	..	....
18	1.49	14	434	1.49	14	434
18	2.09	12	607	2.09	12	607
18	2.68	10	781	2.68	10	781
18	3.27	8	955	3.27	8	955
20	1.66	14	390	1.66	14	390
20	2.32	12	546	2.32	12	546
20	2.98	10	703	2.98	10	703
20	3.63	8	859	3.63	8	859

*Mill coated on outside only.

Dipped Pipe and Galvanizing Extras

The following net extras per foot are for pipe hot dipped in asphaltum.

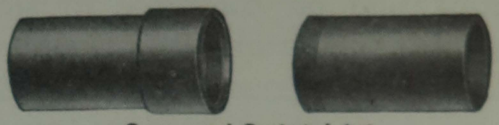
Nominal Size....in.	6	8	10	12	14	16	18	20
Per Foot...........	$.044	.058	.072	.086	.10	.128	.144	.16

The net extra for hot galvanizing is 20% of the pipe list price.

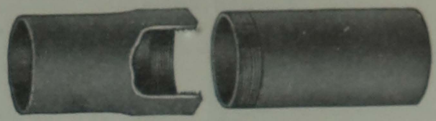
Note that special prices will apply for galvanizing lengths longer than 20 feet or diameters larger than 36 inches.

Lap Welded Casing

For Water, Well and Irrigation Purposes



Screw and Socket Joint



Inserted Joint

Water well casing is made by the lap weld process in two styles of joints; screw and socket, and inserted.

The screw and socket joint requires both ends of the casing to be threaded and lengths are connected by means of a coupling.

The inserted joint is made by enlarging one end of each length of casing and tapping female thread, the other end being male thread of the same diameter.

All Weights and Dimensions are Nominal
Adopted January 1, 1919

		Diam. Inches				Wt., Lbs. per Ft.	
Size In.	Per Ft.	External	Internal	Thick. Wall In.	No. Thds. per In.	Either Style Plain Ends	Screw and Socket Style Thds. and Couplings
2	$.33	2.25	2.05	.1	14	2.29	2.34
2¼	.33	2.5	2.284	.108	14	2.75	2.82
2½	.33	2.75	2.524	.113	14	3.18	3.25
2¾	.40	3	2.768	.116	14	3.57	3.65
3	.41	3.25	3.01	.12	14	4.01	4.1
3¼	.46	3.5	3.25	.125	14	4.50	4.6
3½	.51	3.75	3.492	.129	14	4.98	5.1
3¾	.565	4	3.732	.134	14	5.53	5.65
4	.62	4.25	3.974	.138	14	6.06	6.2
4¼	.685	4.5	4.216	.142	14	6.60	6.75
4½	.74	4.75	4.46	.145	14	7.13	7.25
4¾	.81	5	4.696	.152	14	7.87	8
5	.85	5.25	4.944	.153	14	8.32	8.5
5³⁄₁₆	.90	5.5	5.192	.154	14	8.79	9
5⅝	1.05	6	5.672	.164	14	10.22	10.5
6¼	1.20	6.625	6.287	.169	14	11.65	12
6⅝	1.35	7	6.652	.174	14	12.68	13
7¼	1.48	7.625	7.263	.181	14	14.39	14.75
7⅝	1.60	8	7.628	.186	11½	15.52	16
8¼	1.75	8.625	8.249	.188	11½	16.94	17.5
8⅝	1.90	9	8.608	.196	11½	18.42	19
9⅝	2.28	10	9.582	.209	11½	21.85	22.75
10⅝	2.68	11	10.552	.224	11½	25.78	26.75
11⅝	3.15	12	11.514	.243	11½	30.51	31.5
12½	3.65	13	12.482	.259	11½	35.24	36.5
13½	4.20	14	13.448	.276	11½	40.45	42
14½	4.75	15	14.418	.291	11½	45.71	47.5
15½	5.25	16	15.396	.302	11½	50.63	52.5

The permissible variation in weight is 5 per cent above and 5 per cent below.

Specify definitely whether screw and socket or inserted joint is wanted. Screw and socket type will be furnished unless otherwise specified.

Screw and socket furnished with threads and couplings and in random lengths unless otherwise ordered.

Inserted joint furnished threaded and in random lengths, unless otherwise ordered.

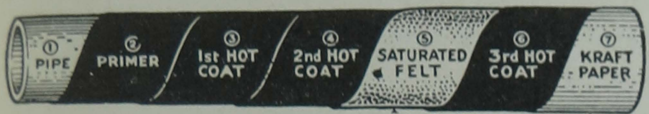
Thickness of walls makes it impracticable to cut threads of coarser pitch than shown on table.

For cut lengths, an extra charge will be made above random.

For galvanized or coated casing, an extra charge will be made above black.

Protected Steel Pipe for Water Systems

Hill-Hubbell Process



One of the Many Types of Wrapping

On account of the many advantages of steel pipe, it is rapidly replacing cast iron in water flow and distribution lines. A medium wall thickness will take care of pressure requirements, the outside protection as illustrated above prevents corrosion and an inside lining prevents tuberculation, greatly increasing flow capacities—all at less cost than any other type of pipe.

Exterior Protection-Mill Applied

Exterior protection is applied mechanically at the mill. A primer coat is first applied to the pipe to serve as a base and binder for the protecting coats of hot asphalt or coal tar. These are the coats that protect the pipe against corrosion. Over these are applied protective wrappings of rag felt, asbestos felt and kraft paper to serve as a buffer between the protective coats and the outside forces of soil stresses. Can be supplied with as many as four coats of hot enamel, with felt between coats. This combination gives a protective coating that is waterproof, acid resisting, corrosion resisting and permanent. Most oil and gas companies, public utilities and municipalities are now using protected steel pipe.

Interior Protection

Cold Coat Lining

For mildly corrosive conditions there is applied at the mill, one or two coats of biturine solution No. 4. This is a heavy bodied, all coal tar solution which is applied cold. It will not chip or flake off. All phenols are removed so that there is no chemical reaction with water treating chemicals.

Akwaline Enamel Hot Lining

For lining pipe, coal tar base enamels are superior because the water absorption of coal tar is practically negligible. Akwaline enamel is an all coal tar pitch made especially for water lines. It is applied in coats of minimum thickness of 1/16 inch, being applied hot and ironed smooth and of uniform thickness. It will not sag at 140 degrees Fahrenheit nor crack at zero degrees Fahrenheit. It will not check, crack or peel. Tuberculation absolutely will not form on this lining. The line will be just as clean and flow properties just as high after years of service as when new. It is this property that makes it ideal for city distribution systems. A steel pipe, properly protected externally and lined with akwaline enamel makes the perfect flow or distribution line. All phenols have been removed so there is no chemical reaction with water treating chemicals. Its life and capacity will exceed any other kind of installation.

Complete details furnished upon request.

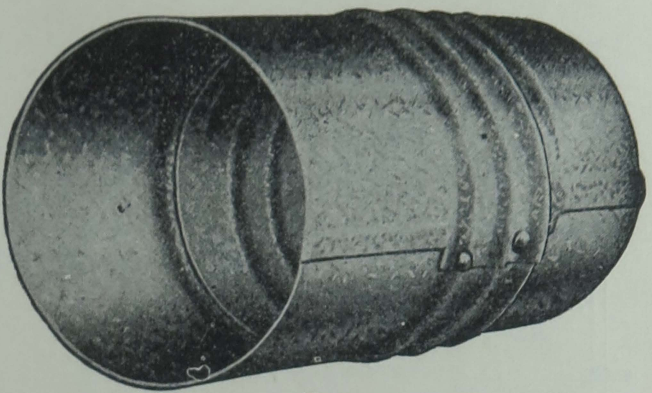
Condenser Tubes

Diameter.......inches	5/8	5/8	3/4	3/4	5/8	3/4
Stubs Gage...........	16	17	16	17	18	18
Wall Decimal...inches	.065	.058	.065	.058	.049	.049
I.D............inches	.495	.509	.620	.634	.527	.652
Approx. Lbs. per Lin. Ft.	.422	.382	.517	.467	.328	.399

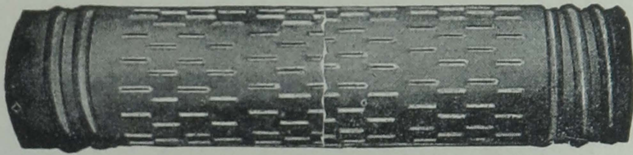
Prices upon application.

Prices also quoted for tinning condenser tubes inside and outside.

Galvanized Sheet Steel Well Casing



Plain



Perforated

List Price per 100 Feet on Both Screw and Slip Joint Casing
Slip Joint Not Illustrated
Plain and Perforated Casing Take Same List

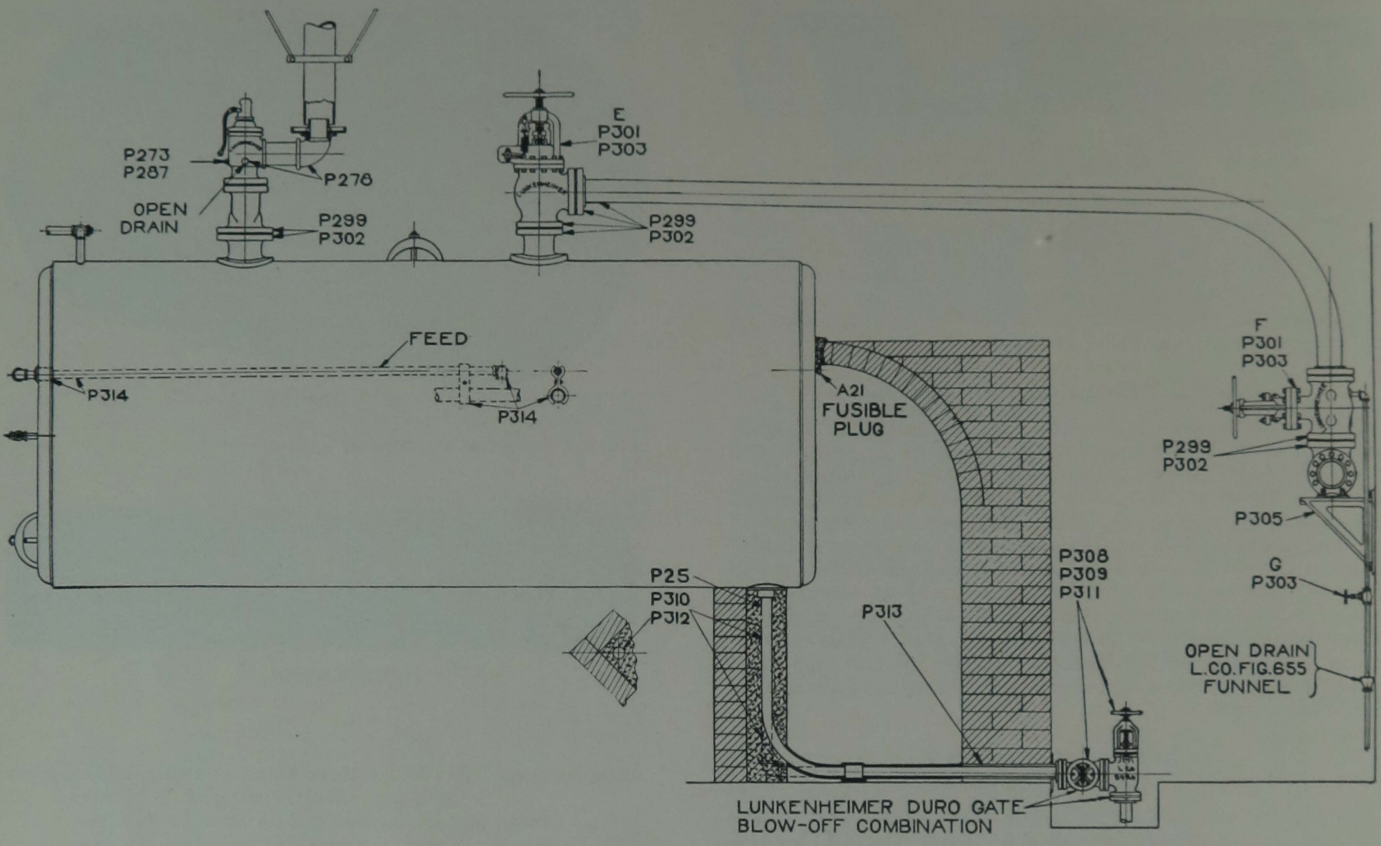
Diameter Inches	Gauge 26	24	22	20	18	16
3	$20.10	$22.60	$25.40	$28.70	......	......
3½	23.00	25.65	28.70	32.25	......	......
4	24.30	27.25	30.70	34.70	......	......
4½	26.70	30.15	33.90	38.35	......	......
5	28.80	32.50	36.60	41.40	......	......
5½	30.90	35.00	39.30	44.90	......	......
6	34.00	38.50	43.50	49.00	$86.15	$108.50
6½	36.00	40.80	46.00	52.00	90.20	114.05
7	38.10	43.35	48.75	55.35	94.20	119.45
7½	42.15	47.50	53.40	60.90	98.25	126.40
8	45.30	51.00	57.20	64.50	102.45	131.00
9	.....	.....	62.00	70.20	113.30	148.50
10	.....	.....	69.20	78.30	128.25	164.30
12	.....	.....	75.60	84.90	148.95	192.35
14	.....	.....	86.50	92.00	174.45	224.00
16	.....	.....	.....	131.25	196.70	249.95
18	.....	.....	.....	152.40	226.95	291.00
20	.....	.....	.....	168.15	250.85	320.55
22	.....	.....	.....	184.80	275.25	354.20
24	.....	.....	.....	199.80	298.50	382.70
30	.....	.....	.....	......	417.00	507.75

All casing 18 inches in diameter and larger made of 16-gauge and lighter should have one or more reinforcing bands in each 30-inch joint.

Screw joint casing is not made larger than 12 inches in diameter and heavier than 20-gauge and cannot be shipped knocked down.

Screw Joint Casing is made in five 30-inch joints to a length, each length threaded on both ends, crated 8 lengths to a crate, one length of which is made up of five 30-inch joints with threads on both ends of each joint.

Application of Lunkenheimer Boiler Mountings Conforming to A.S.M.E. Boiler Code Specifications


E
P301
P303
P273
P287
P278
OPEN
DRAIN
P299
P302
P299
P302
FEED
P314
P314
A21
FUSIBLE
PLUG
F
P301
P303
P299
P302
P305
G
P303
P25
P310
P312
P313
P308
P309
P311
OPEN DRAIN
L.CO.FIG.655
FUNNEL
LUNKENHEIMER DURO GATE
BLOW-OFF COMBINATION

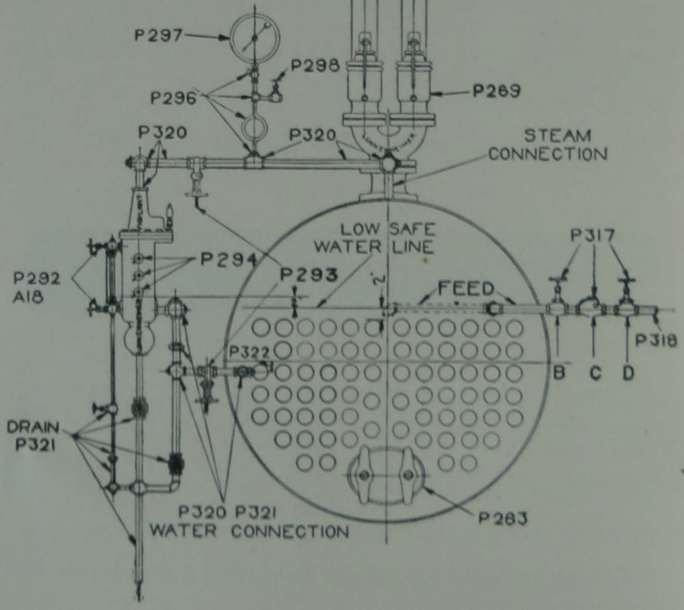
In the design of a new steam plant or of an addition to an existing installation, the necessity for safe, adequate and economical steam boilers has been fully recognized and the types and sizes of the units have been decided upon only after careful investigation of the products of the leading manufacturers.

The same careful consideration has not always been given to the choice of the various appliances known as Boiler Mountings, owing largely to the fact that these devices are frequently made a part of or appended to the boiler specifications. In order that the number of individual contracts may be reduced, it will often be advantageous for the consumer to have the firm supplying the boilers also furnish the boiler mountings, but in such cases the kind and make of the latter should be clearly specified.

The safe and economical operation of the boiler is largely dependent upon the proper functioning of the boiler mountings. Their importance demands the installation of mountings designed and constructed by a manufacturer who has made their production a specialty.

The essential elements of boiler mountings are simplicity, durability and reliability. The successful manufacture of these appliances requires the greatest care in design, based on a thorough knowledge of operating conditions, the selection of proper metals for the specific requirements and the high grade workmanship throughout.

A complete line of Lunkenheimer mountings is available.


P297
P298
P296
P269
P320
P320
STEAM
CONNECTION
LOW SAFE
WATER LINE
P317
P292
A18
P294
P293
2"
FEED
P318
P322
B C D
DRAIN
P321
P320 P321
WATER CONNECTION
P263

Application of Lunkenheimer Boiler Mountings Conforming to A.S.M.E. Boiler Code Specifications

Continued

The Numbers Preceding Notations Refer to Paragraphs of A.S.M.E. Boiler Construction Code 1933 Edition

A.S.M.E. Code		Lunkenheimer Boiler Mountings		
			Figure Number	
Paragraph	Rule	Description	Up to 200 Lbs. W.S.P.	200 to 250 Lbs. W.S.P.
P-12	Cast iron fittings and valves are permitted for pressures up to 250 pounds per square inch and temperatures up to 450 degrees Fahrenheit		....	....
P-269	Boilers having more than either 500 sq. ft. of water heating surface or 2,000 lbs. per hour generating capacity shall have two or more safety valves	Twin Pop Safety Valve	752	752
P-273	Only A.S.M.E. Standard Safety Valves are permissible	Flange Inlet, Side Screw Outlet Pop Safety Valve	630	630
P-278	Escape pipe must be at least full size of discharge opening, and must be supported. A drain is required in the escape pipe		....	....
P-291 P-292 P-294 A-18	Each boiler shall have one water gauge, the lowest visible part to be at least 2″ above low safe water line. Automatic water gauges are permissible. Each boiler shall have three or more gauge cocks located within visible range of water glass except when heating surface does not exceed 50 sq. ft., two gauge cocks permitted	Vigilant Water Column Regrinding Water Gauge Automatic Water Gauge Regrinding Gauge Cocks Renewo Gauge Cocks	919 460 1335 466 1264	919 1332 1335 466 1264
			....	....
P-293	When shut-off valves are used on connections to a water column, they must be outside screw and yoke gate valves and must be locked or sealed open	Bronze Wedge Disc Gate Valves	831	834
P-296	Tee or lever handle cock is the only stop permitted between gauge and boiler. For pressures 250 lbs. or less pipe connections and siphon shall be of brass. For higher pressures, connections shall be 1″ steel pipe	Bronze Steam Gauge Cock	979	472
P-297	Steam gauge shall be graduated to approximately double the working pressure, but in no case to less than 1½ times the maximum allowable working pressure of the boiler		....	....
P-298	¼″ Globe valve for attaching test gauge	Bronze Regrinding Globe Valve	407	409
P-299 P-302	If pressure exceeds 125 lbs. or if the fittings are below the water line, all fittings must be "extra heavy."		....	....
P-301	A stop valve "E" is required on each steam line as near nozzle as is practicable. Valve over 2″ pipe size must be of outside screw and yoke, rising stem type.	Valve "E" Angle Valve. Scr. Ends Flg. Ends	882 885	882 885
P-303	If two or more boilers are connected to a common pipe, valves "E" and "F" are both required. "E" should be "Non-return," and drain "G" is required between the two valves. The open end of drain must be visible while operating valve	Valve "E" Angle Safety "Non-Return" Valve. Scr. Ends Flg. Ends Valve "F" O.S.& Y. Gate Valve Scr. Ends Flg. Ends Valve "G" Bronze Renewo Globe Valve	1442 1408 1435 1436 73	1442 1408 1435 1436 16
P-305	Steam pipe must be supported		....	....
P-308 P-309 P-310 P-311	Globe Valves must not be used as blow-off-valves Two valves or valve and cock are required when pressure exceeds 125 lbs., except traction or portable boilers. Plug must be held in place by guard or gland. For pressures over 250 lbs. steel valves must be used	Duro Blow-off Valve Scr. Ends Flg. Ends O.S.&Y. Gate Valve Scr. Ends Flg. Ends	896 897 1435 1436	896 897 1435 1436
P-25 P-308 P-310 P-312	Blow-off must be of extra strong steel pipe, min. 1″, max. 2½″, and fully protected from direct exposure to flame. A bent pipe is preferred, though a steel elbow is permissible		....	....
P-313	Clearance to provide for free expansion and contraction of pipe		....	....
P-314	Feed pipe must be carried through the head or shell of the boiler at that end which is subjected to the hottest gases; it must be extended about three-fifths of the length from that end and fastened above the central row of tubes		....	....
P-317	Valves "B" and "C" required on all boilers. "D" is required only when two or more boilers are fed from one source. Inlet shall be under the disc	Valves "B" and "D" Bronze Renewo Globe Valve Valve "C" Bronze Regrinding Swing Check Valve	73 554	16 624
P-318	Boilers having more than 500 sq. ft. of water-heating surface require two means of feeding one of which shall be a pump, inspirator or injector. On boilers having more than 100 sq. ft. of heating surface, the feed pipe shall be not less than ¾″ pipe size		....	....
P-320 P-321 P-322	Minimum size pipe between water column and boiler to be 1″. Use crosses at all turns. Water connection to boiler to be not less than 6″ below center of shell. Water column drain valve to be at least ¾″, connected to ash pit	Vigilant Water Column Bronze Water Gauge Bronze Renewo Globe Valve Bronze Ground Joint Union Bronze Crosses Bronze Plugs	919 1335 73-P 458 672 680	919 1335 16-P 302 704 680
A-21	Fusible Plug shall be located at lowest permissible water level	Regular Standard ... 1326-1327 Fusible Plug ... 1328-1329	....	....

Approximate Weight of Brass and Ferrenewo Valves in Pounds

Size . . . . inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Standard Brass and Angle Valves	.25	.33	.50	1.00	1.50	2.33	3.50	5.00	7.50	11.00	18.00
No. 106 Jenkins Bros. Globe Valves	.75	.75	1.00	1.50	2.25	3.25	4.87	7.87	11.37	.....	.....
“ 108 “ “ Angle “	.75	.75	1.00	1.50	2.25	3.25	4.87	7.87	11.37	.....	.....
“ 7 Crane Brass Globe and Angle Valves	.50	.66	1.00	1.50	2.00	3.00	4.50	6.66	10.50	15.00	26.00
“ 4 “ “ “ “ “ “	...	.90	1.11	1.60	2.10	3.00	4.75	6.75	11.00	16.00	26.00
“ 72 Lunkenheimer Bronze Angle Renewo Valves	...	.81	.86	1.30	2.20	3.25	4.69	6.38	10.25	18.00	26.00
“ 73 “ “ Globe “ “	...	.81	.88	1.36	2.36	3.45	4.75	6.60	10.80	19.00	27.00
“ 407 “ “ “ “ “	.41	.75	.80	1.25	2.23	3.00	4.41	5.81	9.75	17.00	24.00
“ 408 “ “ Angle “ “	.41	.74	.78	1.18	2.06	2.83	4.22	5.59	9.06	17.00	23.00
“ 1521 “ Renewo Throttling Globe Valves	...	.81	.88	1.30	2.20	3.45	4.75	6.60	10.80	19.00	26.00
“ 1561 Lunkenheimer Bronze Renewo Throttling Angle Valves	...	.81	.86	1.30	2.20	3.25	4.69	6.38	10.25	18.00	26.00
“ 1523 Lunkenheimer Bronze Renewo Full-way Globe Valves	...	.81	.88	1.30	2.20	3.45	4.75	6.60	10.80	19.00	27.00
“ 1599 Lunkenheimer Bronze Renewo Full-way Angle Valves	...	.81	.88	1.30	2.20	3.45	4.75	6.60	10.80	19.00	27.00
“ 16 “ Renewo Full-way Globe Valves	...	1.10	1.23	1.79	3.25	4.81	6.88	9.25	19.00	29.00	40.00
“ 17 “ “ “ Angle “	...	1.06	1.10	1.71	3.00	3.45	6.50	8.90	17.30	27.00	38.00
“ 409 “ “ Globe Valves	...	1.11	1.21	1.70	3.13	4.42	6.28	8.66	15.88	28.00	37.00
“ 557 “ “ Angle “	...	1.05	1.18	1.63	2.96	4.06	5.88	8.19	15.00	25.00	35.00
“ 906 Standard Brass Needle Valves	.41	.44	.55	.89	....	....	....	....	.....	.....	.....
“ 907 “ “ “ “	.39	.45	.52	.88	....	....	....	.....	.....	.....	.....
“ 908 “ “ “ “	.60	.66	.75	1.00	....	....	....	.....	.....	.....	.....
“ 909 “ “ “ “	.50	.50	.60	.90	....	....	....	.....	.....	.....	.....
“ 910 “ “ “ “	.50	.50	.60	.90	...	....	....	.....	.....	.....	.....
Jenkins Rapid Action Valves	...	...	...	3.00	4.50	5.75	8.00	10.50	17.50	24.00	.....
Standard Horizontal Brass Check Valves	.20	.25	.50	.66	1.00	1.50	1.75	3.00	4.75	.....	.....
“ Vertical “ “ “	.20	.25	.50	.66	1.00	1.50	1.75	3.00	4.75	.....	.....
“ Angle “ “ “	.20	.25	.50	.67	1.00	1.50	1.75	3.00	4.75	.....	.....
“ Brass Swing Check Valves	...	...	...	.50	.66	1.00	1.00	2.00	3.00	5.00	7.00
“ “ Ball “ “	.25	.50	.67	.75	1.25	1.87	2.75	3.87	7.25	.....	.....
“ 1451 Lunkenheimer Steel Renewo Globe Valves	...	...	...	2.72	4.31	6.75	9.75	13.13	24.00	.....	.....
“ 1452 “ “ “ Angle “	...	...	...	2.58	4.25	6.50	8.75	12.33	22.50	.....	.....
“ 1398 “ SA Anti-acid Globe Valves, Screwed	...	...	...	1.59	2.50	4.00	5.50	7.50	12.50	.....	.....
“ 1399 “ “ “ “ “ Flanged	...	...	...	....	....	....	....	12.88	20.38	.....	.....
“ 1525 “ Ferrenewo Full-way Globe Valves	...	1.25	1.34	1.75	2.94	4.25	6.08	8.47	14.00	.....	.....
“ 1563 “ “ “ Angle “	...	1.17	1.29	1.85	2.88	4.23	5.94	8.17	13.50	.....	.....
“ 1536 “ “ Throttling Globe “	...	....	1.10	1.63	2.56	4.00	5.75	8.13	13.50	.....	.....
“ 1564 “ “ “ Angle “	...	1.25	1.40	1.69	2.68	3.94	5.75	7.78	12.75	.....	.....
“ 1021 “ “ Globe Valves	...	1.16	1.30	1.80	3.17	4.50	6.42	8.52	13.83	.....	.....
“ 1022 “ “ Angle “	...	1.16	1.21	1.86	2.90	4.29	6.00	8.22	13.50	.....	.....
“ 898 “ Horizontal Ferrenewo Check Valves	...	.75	.98	1.33	2.00	3.31	4.60	6.63	11.69	.....	.....
“ 899 “ Angle “ “ “	...	.73	.78	1.25	1.89	3.00	4.38	6.19	10.50	.....	.....
“ 117 Jenkins Bronze Check Valves	.40	.90	1.20	1.20	1.90	2.50	3.80	4.15	8.90	13.60	23.00
“ 118 “ “ “ “	.40	.90	1.20	1.20	1.80	2.40	3.20	4.80	7.10	12.12	22.00
“ 119 “ “ “ “	.40	.70	1.00	1.30	1.50	2.00	3.12	4.04	7.00	12.00	19.80
“ 416 Lunkenheimer Bronze Ball Check Valves	.20	.23	.43	.65	1.25	2.18	3.20	4.70	8.25	13.31	19.44
“ 739 “ “ “ “ “	.20	.24	.38	.58	1.10	2.00	2.85	4.10	6.94	11.75	16.17
“ 740 “ “ “ “ “	.18	.27	.32	.54	1.08	1.73	2.48	3.45	6.67	11.25	15.34
“ 414 “ Check Valves	.17	.40	.43	.69	1.29	1.83	2.90	4.06	7.06	11.38	16.19
“ 415 “ “ “	.20	.36	.41	.64	1.05	1.63	2.54	3.65	6.13	11.00	15.13
“ 413 “ “ “	...	.61	.73	1.06	1.88	2.84	4.41	5.88	10.06	17.00	24.00
“ 621 “ “ “	...	.56	.69	.95	1.69	2.50	3.75	5.38	8.75	15.50	23.50
“ 624 “ Bronze Swing Check Valves	...	.66	1.02	1.10	1.74	2.83	4.00	5.63	9.00	13.50	19.75
“ 554 “ “ “ “ “	...	.54	.61	.80	1.25	2.00	2.88	3.81	6.75	10.25	15.13
Standard Brass Gate Valves	...	.66	.75	1.00	1.50	2.25	3.25	4.75	7.50	11.50	18.00
“ “ “ “ Q. O.	...	...	...	....	2.25	3.75	5.00	6.75	10.75	15.75	23.50
“ 370 Jenkins Bronze Gate Valves	...	.75	.75	1.25	2.25	3.25	4.37	6.25	10.00	16.50	.....
Standard Brass Hose Gate Valves	...	.70	.80	1.10	1.65	2.50	3.50	5.00	8.00	12.00	19.00
“ 427 Lunkenheimer Bronze “ “	...	.76	.81	1.20	2.09	3.13	4.41	6.20	9.75	16.38	22.00
“ 768 “ “ “ “ Screwed	...	1.00	1.03	1.27	2.13	3.64	5.16	7.10	11.65	.....	.....
“ 769 Lunkenheimer Bronze Gate Valves, Flanged	...	....	1.90	2.50	4.50	6.25	8.73	11.86	19.55	.....	.....
“ 831 Lunkenheimer Bronze Gate Valves	...	....	....	....	2.88	4.52	6.67	9.00	14.20	.....	.....
“ 66-E Crane Brass Gate Valves, Screwed	...	....	....	2.61	4.14	5.96	8.55	12.38	21.00	32.80	55.50
“ 67-E “ “ “ “ Flanged	...	....	....	....	....	9.25	14.50	22.00	32.00	48.00	76.00
“ 771 Lunkenheimer Bronze Gate Valves	...	1.42	....	2.13	3.44	5.70	8.05	11.05	18.15	27.67	37.25
“ 834 “ “ “ “	...	....	....	....	4.00	6.00	8.00	12.00	21.00	30.00	44.00
“ 430 “ Handy Bronze Gate Valves	...	....	....	.95	1.21	1.88	2.81	3.91	5.15	9.00	13.63
“ 431 “ Bronze Throttle Valves	...	....	....	1.34	2.75	3.88	5.22	6.88	10.56	20.50	.....
“ 1411 “ SA Gate Valves	...	....	....	....	3.00	4.75	7.13	9.56	15.50	.....	.....

Approximate Weight of Iron and Iron Body Valves in Pounds

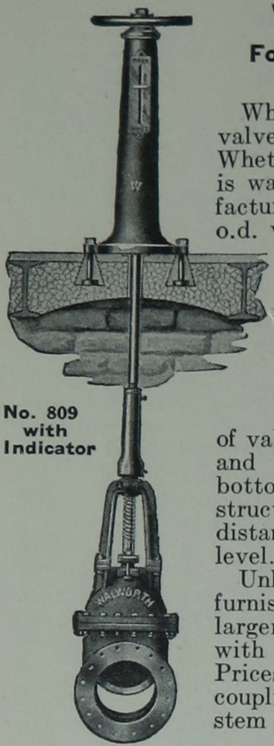
Size.........................inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Standard Globe & Angle Valves, Screwed...	25	30	42	55	68	80	114	158	210	289	...	455	761
" " " " " Flanged...	33	40	60	71	95	100	139	188	256	323	...	503	880
" " " " " (With Yoke) Screwed................	..	40	50	66	81	..	139	197	296	396	...	688	954
Standard Globe & Angle Valves, (With Yoke) Flanged............	..	57	64	85	104	...	163	224	326	413	...	700	1260
No. 340 Crane Globe Valves.......	24	27	59	74	100	...	149	...	...	...	...	...	...
" 1120 Lunkenheimer Globe Valves....	24	35	50	65	86	100	128	188	...	...	...	...	...
" 1121 " Angle "	23	34	51	67	82	97	121	182	...	...	...	...	...
" 1126 " Globe "	37	54	76	98	127	150	191	265	...	...	...	...	...
" 1127 " Angle "	36	67	74	95	119	139	176	253	...	...	...	...	...
" 881 " Globe "	50	74	100	123	163	...	...	...	...	...	...	...	...
" 882 " Angle "	50	70	97	122	154	...	...	...	...	...	...	...	...
" 141–143 Jenkins Globe & Angle Valves, Screwed...............	24	38	55	66	93	116	133	219	264	358	464	582	870
No. 142–144 Jenkins Globe & Angle Valves, Flanged...............	31	47	66	85	108	132	156	233	304	400	488	591	880
Standard Horizontal Check Valves, Screwed....	9	13	20	44	51	60	87	121	...	...	...	...	...
" " " " Flanged....	..	..	37	..	78	..	113	151	210	259	...	367	700
" Vertical " " Screwed....	..	18	34	37	46	56	...	...	...	...	...	...	...
" Swing " " "	12	20	30	38	50	80	89	122	150	219	...	316	510
" " " " Flanged....	..	31	45	60	74	..	110	150	183	251	...	378	600
No. 228 Lunkenheimer Swing Checks, Screwed.	15	22	29	43	52	69	80	108	...	...	...	...	...
" 933 " " " Flanged.	23	34	43	62	72	88	99	131	...	244	...	...	...
" 324 " Screwed I. B. Checks..	30	41	59	73	97	..	...	...	...	...	...	...	...
" 323 " Flanged I. B. " ..	43	64	81	105	134	165	190	251	...	435	...	...	...
" 1314 " Steel Checks, Screwed..	45	66	83	115	135	155	176	255	...	455	...	...	...
" 1397 " " " Flanged..	46	67	84	117	137	158	179	259	...	460	...	...	...
Standard Gate Valves, Screwed.....	33	37	47	60	74	89	97	125	174	210	285	360	545
" " " Flanged.....	39	51	60	79	98	113	120	155	212	255	273	403	581
" Hub End Gate Valves....	35	..	63	...	93	..	116	157	205	237	...	402	535
" Gate Valves, O. S. & Y., Screwed.	25	30	42	55	68	80	114	158	210	289	...	455	761
No. 325 Jenkins Gate Valves, Screwed..	28	33	46	58	75	83	101	133	180	220	281	353	494
" 326 " " " Flanged..	34	43	59	74	96	107	126	163	218	271	323	420	590
" 1575 Lunkenheimer All Iron Gate, Screwed..	22	35	45	59	76	81	108	140	...	...	...	...	...
" 1576 " " " " Flanged..	30	33	54	..	94	..	130	170	...	...	...	...	...
" 1577 " O. S. & Y. All Iron Gate, Screwed............	24	36	45	68	85	93	123	165	...	...	...	...	...
No. 1578 Lunkenheimer O. S. & Y. All Iron Gate, Flanged..........	32	44	55	..	100	...	138	185	...	325	...	...	...
No. 1406 Lunkenheimer S. A. Flanged Gate Valves...........	30	44	53	..	99	...	...	163	...	298	...	...	...
No. 1427 Lunkenheimer Gate Valves, Screwed..	25	34	45	60	74	89	108	149	...	...	...	...	...
" 1428 " " " Flanged..	31	43	54	72	91	101	130	165	225	284	...	...	...
" 1429 " " " Screwed..	26	36	47	63	80	94	124	168	...	...	...	...	...
" 1430 " O. S. & Y. Gate Valves, Flanged...............	33	45	57	76	99	109	139	188	241	300	...	...	669
No. 1433 Lunkenheimer Gate Valves, Screwed..	43	60	77	99	132	...	...	...	...	...	...	...	...
" 1434 " " " Flanged..	53	76	99	130	170	195	244	331	...	...	...	...	...
" 1435 " O. S. & Y. Gate Valves, Screwed...............	45	65	83	104	141	...	...	...	...	...	...	...	...
No. 1436 Lunkenheimer O. S. & Y. Gate Valves, Flanged............	57	81	106	133	179	209	263	361	...	550	...	...	...
No. 628 Handy Gate Valves......	10	13	19	31	46	51	63	100	...	203	...	...	...
" 432 Lunkenheimer Throttle Valves..	18	32	47	57	72	..	118	147	...	...	...	...	...
Standard Butterfly Valves.........	5	10	13	16	22	..	32	42	...	...	...	...	...
Size.........................inches	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
No. 600 Lunkenheimer Clip Gates, Screwed....	1.5	2.3	3.5	4.5	6.3	9.5	15.6	24.5	37.	49.5	65.	82	114
" 639 " BM Q. O. Clip Gate Valves	.....	.....	.....	.....	....	10.1	18.3	25.4	39.	49.5	....	84	119
" 321 " Clip All Iron Gates, Screwed	1.9	2.5	3.5	4.5	6.6	10.2	17.3	25.3	38.5	48.	....	83	113
" 320 " " " " " Flanged	18.	27.	38.	53.	71	84.	108.	138.	....	....	....	..	...
" 318 " " " " " "	16.33	25.40	35.92	51.88	69.5	81.	101.	135.5	....	....	....	..	...
" 319 " " " " " Screwed	1.5	2.3	3.5	4.5	6.4	9.5	15.5	25.	37.	49.5	62.5	85	111
Standard Iron Body Foot Valves...	.....	1.5	2.	3.	4.	7.	9.	12.	20.	26.	33.	39	45

Approximate Weight of Cocks in Pounds

Size..................................inches	¼	⅜	½	¾	1	1¼	1½	2	2½	3
All Iron, Straight Way..........	....	....	1.3	1.5	2.5	5.	7.5	11.5	20.	30.
" " 3 Way..........	....	....	....	2.5	4.	6.	8.	12.	21.	32.
Asbestos Packed..........	1.	1.3	2.	4.	7.	11.	14.	20.	35.	58.
Bibbs..........	....	....	1.	1.5	2.	3.4	.....	.....	.....	.....
Brass Steam..........	.30	.47	.58	.96	1.47	2.41	3.57	6.20	12.75	20.
" " Extra Heavy..........	....	....	1.00	1.56	2.90	5.08	7.50	11.50	19.25	34.
" " 3 Way..........	....	.75	1.20	1.84	2.63	4.40	5.25	9.10	15.40	24.
" Gas Service..........	.26	.38	.47	.82	1.16	1.93	2.75	4.95	.....	.....
Iron Body Brass Plug, Straight Way..........	....	....	....	1.50	3.00	5.00	7.00	11.00	19.00	29.
Rough Stop, Plain..........	....	.78	1.00	1.20	1.50	3.00	4.00	7.75	.....	.....
" " and Waste, L. Handle..........	....	....	1.00	1.75	2.25	.....	.....	.....	.....	.....
" " " " T. "	....	....	1.00	1.38	2.25	3.50	5.13	8.38	.....	.....
No. 904 Lunkenheimer Bronze Gas Throttle Cocks...	....	.56	.88	1.22	2.17	3.50	5.15	8.88	.....	.....
Standard Brass Butterfly Valves..........	....	....	....	.75	1.25	1.75	2.00	4.00	6.50	8.33

Walworth Floor Stands

For Rising or Non-Rising Stem Valves



No. 809 with Indicator

When ordering floor stands for all valves give the following information: Whether stand with or without indicator is wanted; size and style valve; manufacturer's name and Fig. No. of valve; o.d. valve hand wheel; number of turns to right or left to open; diameter of valve stem.

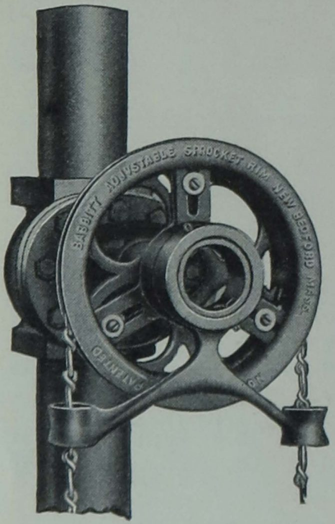
If extension stems and couplings are required give following information: For non-rising stem valves—center of valve to bottom of valve stem square, dimensions valve stem square, distance from center of valve to floor level; for outside screw and yoke valves—center of valve to bottom of hand wheel hub, detailed construction of yoke nut where wheel fits, distance from center of valve to floor level.

Unless otherwise ordered 32-inch stands furnished for valves having 9-inch or larger hand wheel; 20-inch for valves with hand wheel less than 9 inches. Prices do not include extension stem or coupling; price according to length of stem and size and style of valve.

	No. 808 Without Indicator		**No. 809 With Indicator**	
Description	20" High	32" High	20" High	32" High
Painted Column; Japanned Wheel..................each	$15.00	$20.00	$22.00	$27.00
Finished Column; Japanned Wheel..................each	28.00	35.00	35.00	42.00
Finished Column; Rim and Hub of Wheel Finished; Spokes Japanned.......each	40.00	48.00	47.00	55.00

Babbitt Adjustable Sprocket Rims

With Chain Guides


BABBITT ADJUSTABLE SPROCKET RIM NEW BEDFORD MASS.

Every valve in an overhead pipe line should be equipped for immediate operation from the floor. The Babbitt Adjustable Sprocket Rim and Chain Guide gives this instantaneous control by simply pulling the chain.

The rim is adjustable and may be quickly attached to any type of valve wheel whether used for controlling the flow of steam, gas, water, or other liquids, and does not interfere with the rising stem.

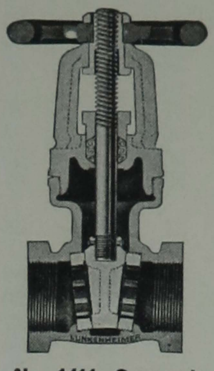
When ordering give diameter of valve wheel to be fitted and number of feet of chain required.

No.	Each	Chain per Foot	Diameter Sprocket Wheel Inches	Will Fit Valve Wheels Diamcter Inches
0	$2.40	$.08	4	2 to 4
1	4.00	.10	5⅞	4⅛ to 5⅞
1½	5.20	.10	7½	6 to 7½
2	6.40	.10	9	7¾ to 9
2½	8.80	.16	12½	9¼ to 12½
3	10.80	.16	15½	12¾ to 15½
3½	15.20	.16	19	15¾ to 19
4	20.00	.24	22	19¼ to 22
4½	28.00	.24	26	22¼ to 26
5	32.00	.24	30	26¼ to 30

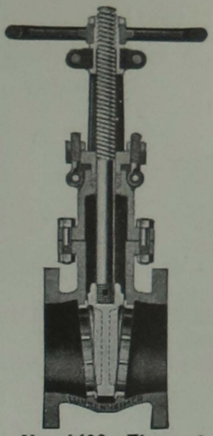
Lunkenheimer SA Gate Valves

For Corrosive Service

Wedge Disc—Rising Stem—Outside Screw



No. 1411, Screwed



No. 1406, Flanged

For use primarily in handling sulphuric acid, alkalis and other corrosive fluids in the manufacture of sugar, paper, rubber, caustics, fertilizers, coke and by-products, in oil refineries, water softening processes, etc.

Size In.	Face to Face Inches Screwed	Face to Face Inches Flanged	Diam. Flanges In.	Price, Each No. 1411 Screwed	Price, Each No. 1406 Flanged
¾	2¾	...	....	$50.00	......
1	3 5/16	...	....	60.00	......
1¼	3⅝	...	....	70.00	......
1½	3 15/16	...	....	80.00	......
2	4 9/16	4¾	6	100.00	$160.00
2½	...	5¼	7	......	185.00
3	...	5⅝	7½	......	225.00
4	...	6⅞	9	......	400.00
6	...	8¼	11	......	600.00
8	...	9⅜	13½	......	1000.00

Lunkenheimer Bronze Gate Valves

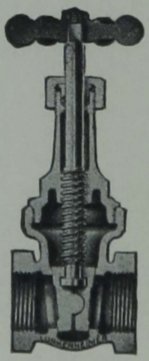
Double Disc, Rising Stem, Inside Screw, Screwed Bonnet

Screwed

150 Lbs. W.S.P., 500° F.
300 Lbs. G.L.P., 150° F.

Flanged

150 Lbs. W.S.P., 500° F.
225 Lbs. G.L.P., 150° F.



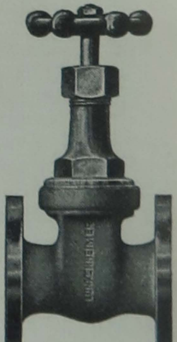
No. 427, Screwed

The simple and practical ball and socket bearing between the discs provides the greatest degree of flexibility in seating engagement and a tight valve is insured. Discs are guided by ribs cast within body. Stuffing box is repackable when valve is under pressure and full open.

Gland is provided in the stuffing boxes on sizes 1-inch and larger.

All parts are renewable.

Being double seated, pressure can be taken from either end.



No. 617, Flanged

Size Inches	No. 427 Screwed Each	No. 617 Flanged Each	No. 617 Flanged Face to Face Inches	No. 617 Flanged Diam. Flanges Inches
¼	$1.10	......	...	...
⅜	1.10	$2.60	2¾	2½
½	1.30	3.00	3 1/16	3½
¾	1.90	4.00	3½	3⅞
1	2.50	5.30	3 13/16	4¼
1¼	3.50	7.70	4¼	4⅝
1½	5.00	10.50	4⅞	5
2	7.50	14.00	5⅝	6
2½	14.00	21.00	6¾	7
3	20.00	32.00	7½	7½

Lunkenheimer Bronze Gate Valves

Wedge Disc, Non-Rising Stem, Inside Screw Screwed Bonnet

Screwed

200 Lbs. W.S.P., 500° F
400 Lbs. G.L.P., 150° F.

Flanged

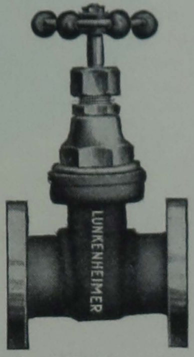
150 Lbs. W.S.P., 500° F.
225 Lbs. G.L.P., 150° F.

o. 768, Screwed

These valves are of the wedge disc, double seated type, permitting pressure to be taken from either end.

Disc is well guided by ribs cast within the body.

A gland is provided in the stuffing box of the 1-inch and larger sizes.



No. 769, Flanged

ize nches	No. 768 Screwed Each	No. 769 Flanged Each	No. 769 Flanged Face to Face Inches	No. 769 Flanged Diam. Flanges Inches
¼	$1.70	.....	...	...
⅜	1.70	$3.50	2⅞	2½
½	1.80	3.70	3⅛	3½
¾	2.30	4.60	3½	3⅞
	3.00	5.90	4⅛	4¼
1¼	4.20	8.10	4½	4⅝
1½	6.00	11.00	$4\frac{15}{16}$	5
2	9.00	16.00	5⅞	6
2½	17.00	27.00	6¾	7
3	24.00	35.00	7⅜	7½

Lunkenheimer Bronze Gate Valves

Wedge Disc, Non-Rising Stem, Inside Screw Screwed Bonnet

Screwed

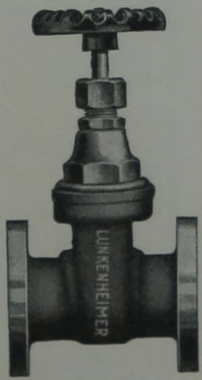
300 Lbs. W.S.P., 550° F.
600 Lbs. G.L.P., 150° F.

Flanged

250 Lbs. W.S.P., 500° F.
375 Lbs. G.L.P., 150° F.

No. 771, Screwed

Wedge disc, double seated type, permitting pressure to be taken from either end. Disc is well guided by ribs cast within body. All parts renewable, including seat rings on sizes 1-inch and larger. Stuffing box is repackable under pressure when valves are full open. Gland provided in stuffing box for 1-inch and larger sizes.



No. 772, Flanged

Size Inches	No. 771 Screwed Each	No. 772 Flanged Each	No. 772 Flanged Face to Face Inches	No. 772 Flanged Diam. Flanges Inches
¼	$3.75	.....	...	...
⅜	3.75	.....	...	...
½	3.90	$9.50	3½	3¾
¾	5.20	11.50	4⅛	4⅝
1	6.40	15.00	4¾	4⅞
1¼	8.00	19.50	5	5¼
1½	10.50	26.00	5¾	6⅛
2	15.20	36.00	6½	6½
2½	23.00	51.00	7	7½
3	33.00	67.00	7¼	8¼

Lunkenheimer Bronze Gate Valves

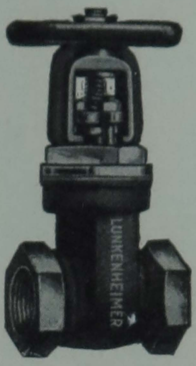
Wedge Disc, Rising Stem, Outside Screw, Screwed Yoke Bonnet

Screwed

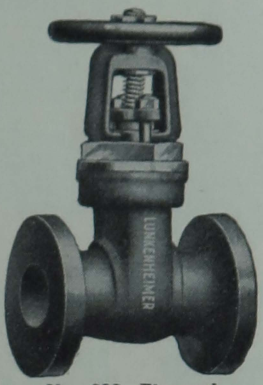
200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.

Flanged

150 Lbs. W.S.P., 500° F.
225 Lbs. G.L.P., 150° F.



No. 831, Screwed



No. 832, Flanged

Wedge disc, double seated type valves. Will take pressure from either end. Disc is well guided by ribs cast within body. All parts are renewable, including seat rings on sizes 1-inch and larger. Stuffing box is repackable under pressure when valve is full open.

Size Inches	No. 831 Screwed Each	No. 832 Flanged Each	No. 832 Flanged Face to Face Inches	No. 832 Flanged Diam. Flanges Inches
¾	$3.50	$6.90	3½	3⅞
1	5.50	8.80	4⅛	4¼
1¼	6.30	12.00	4½	4⅝
1½	9.00	15.50	$4\frac{15}{16}$	5
2	14.00	24.00	5⅞	6
2½	21.00	33.00	6¾	7
3	31.00	45.00	7⅜	7½

Lunkenheimer Bronze Gate Valves

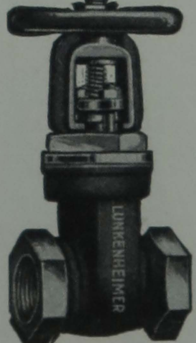
Wedge Disc, Rising Stem, Outside Screw Screwed Yoke Bonnet

Screwed

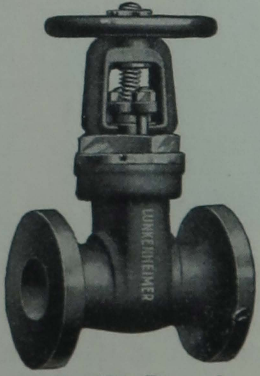
300 Lbs. W.S.P., 550° F.
600 Lbs. G.L.P., 150° F.

Flanged

250 Lbs. W.S.P., 500° F.
375 Lbs. G.L.P., 150° F.



No. 834, Screwed



No. 835, Flanged

Being of the wedge disc, double seated type, these valves will take the pressure from either end.

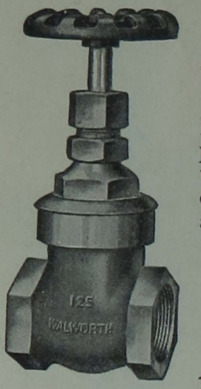
The disc is well guided by ribs cast within the body.

All parts are renewable, including the seat rings on the 1-inch and larger sizes. The stuffing box is repackable under pressure when the valve is full open.

Size Inches	No. 834 Screwed Each	No. 835 Flanged Each	No. 835 Flanged Face to Face Inches	No. 835 Flanged Diam. Flanges Inches
1	$8.25	$17.50	4¾	4⅞
1¼	11.50	22.50	5	5¼
1½	13.00	31.00	5¾	6⅛
2	18.00	41.00	6½	6½
2½	30.00	58.00	7	7½
3	40.00	72.00	7¼	8¼

No. 4 Walworth Bronze Screwed Gate Valves

Solid Wedge, Non-Rising Stem, with Gland



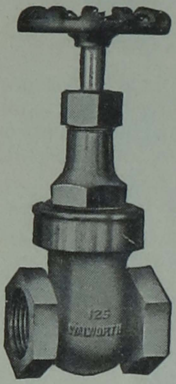
For 125 Pounds Steam Working Pressure
175 Pounds Non-Shock Working Oil, Water or Gas Pressures at Ordinary Air Temperatures

Red enameled non-heating hand wheel; heavy hexagon ends. Will not stretch when pipe joint is made up. Can be repacked under pressure when wide open. Increased end to end dimensions allow ample clearance between end of pipe and valve seat.

Size In.	End to End, In.	Each	Size In.	End to End, In.	Each
¼	1²¹⁄₃₂	$1.45	1¼	3⅛	$3.70
⅜	1¾	1.45	1½	3⁹⁄₁₆	5.00
½	2⅛	1.65	2	4	7.30
¾	2⁵⁄₁₆	2.05	2½	4½	13.00
1	2⅝	2.80	3	5½	19.00

No. 5 Walworth Bronze Double Disc Screwed Gate Valves

Sizes ¼ to 3 Inches, Rising Stem
3½ and 4 Inches, Non-Rising Stem



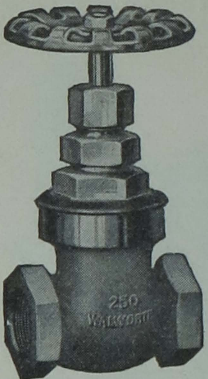
Working Steam Pressures
Sizes ¼ to 3 Inches, 125 Pounds
Sizes 3½ and 4 Inches, 100 Pounds
Non-Shock Working Oil, Water, or Gas Pressures, at Ordinary Air Temperatures
Sizes ¼ to 3 inches, 150 Pounds
Sizes 3½ and 4 Inches, 125 Pounds

Can be repacked under pressure when wide open.

Size In.	End to End, In.	Each	Size In.	End to End, In.	Each
¼	1¹¹⁄₁₆	$1.45	1½	3	$5.00
⅜	1¾	1.45	2	3⁷⁄₁₆	7.30
½	1¹⁵⁄₁₆	1.65	2½	4¹⁄₁₆	13.00
¾	2³⁄₁₆	2.05	3	4⅝	19.00
1	2½	2.80	3½	6¹³⁄₁₆	43.00
1¼	2¾	3.70	4	7½	58.00

Walworth Bronze Gate Valves

Non-Rising Stem, Solid Wedge, With Gland



No. 34 Screwed

For 250 Pounds Steam Working Pressure

Has red enameled non-heating hand wheel.

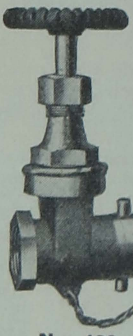
Can be repacked while under pressure when valve is wide open.

Size In.	Each: No. 34 Screwed	Each: No. 34F Flanged	Face to Face, Flg. Inches	Diam. Flg., In.
⅜	$4.00	.....	...	...
½	5.00	.....	...	...
¾	6.00	.....	...	...
1	8.00	$16.00	4⁵⁄₁₆	4⅞
1¼	11.25	21.50	4⁹⁄₁₆	5¼
1½	16.50	30.00	5⁵⁄₁₆	6⅛
2	23.00	41.00	6³⁄₁₆	6½
2½	40.00	65.00	7⅛	7½
3	65.00	100.00	8³⁄₁₆	8¼

Flanged valves made to order only.

Brass Hose Gate Valves

Iron Wheel, Rough Body, Plain, Solid Wedge, Non-Rising Steam



No. 433

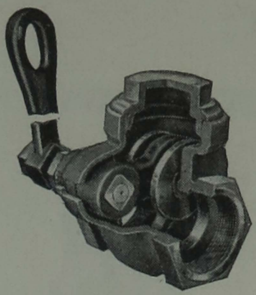
For 200 Pounds Cold Water Working Pressure

Size Inches	Price, Each: With Cap and Chain	Price, Each: Without Cap and Chain	Size Inches	Price, Each: With Cap and Chain	Price, Each: Without Cap and Chain
1	$5.10	$3.35	2	$12.60	$9.00
1¼	6.70	4.70	2½	20.00	15.00
1½	8.85	6.25	3	29.50	22.00

When ordering, always supply thread information to avoid delay.

No. 431 Lunkenheimer Bronze Heavy Lever Gate Valves

175 Lbs. W.S.P.



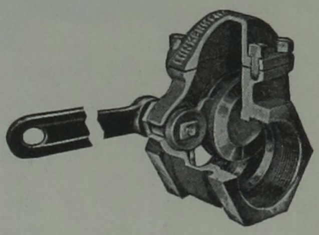
For use on steam, water, oil and other liquids.

The simple and practical ball and socket wedging principle of the disc construction provides positive seating of the discs under trying service conditions.

Size Inches	No. 431 Screwed Each	Size Inches	No. 431 Screwed Each
½	$2.50	1½	$7.00
¾	3.00	2	10.00
1	4.00	2½	19.00
1¼	5.00	...	.....

No. 430 Lunkenheimer Handy Bronze Gate Valves

75 Lbs. W.S.P.



A quick opening valve for handling water, oils, lactic and other classes of liquids and low pressure steam.

The ball and socket bearing between the discs is the most flexible and practical wedging principle and prevents many unusual conditions from interfering with the functioning of the disc.

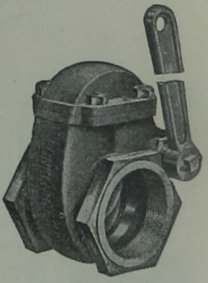
Size Inches	No. 430 Screwed Each	Size Inches	No. 430 Screwed Each	Size Inches	No. 430 Screwed Each
½	$1.60	1½	$5.00	3½	$40.00
¾	1.80	2	7.50	4	60.00
1	2.50	2½	13.50	...	......
1¼	3.50	3	19.00	...	.....

No. 628 Lunkenheimer Handy Iron Body Gate Valves

Bronze Mounted

75 Lbs. W.S.P.

A quick opening valve for handling water, oils and other classes of liquids and low pressure steam.



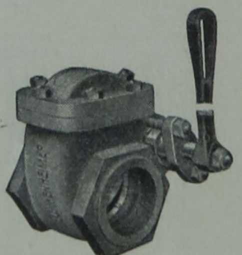
Size Inches	Face to Face Inches	No. 628 Screwed Price, Each
2	4¼	$7.00
2½	4½	12.00
3	5	15.00
3½	6⅛	18.00
4	6⁵⁄₁₆	21.00
4½	6½	25.00
5	7⁵⁄₁₆	30.00
6	8¼	42.00
8	9¾	90.00

No. 432 Lunkenheimer Iron Body Heavy Lever Gate Valves

Bronze Mounted

For Working Steam Pressures Up to 3 Inches, 175 Pounds; 3½ and 4 Inches, 125 Pounds; 5 and 6 Inches, 100 Pounds

The simple and practical ball and socket wedging principle of the disc construction provides positive seating under trying service conditions.



Size Inches	Each	Face to Face Inches
2	$8.50	5½
2½	16.00	6⅜
3	20.00	6¼
3½	25.00	6¾
4	30.00	7¼
5	35.00	8½
6	40.00	9¼

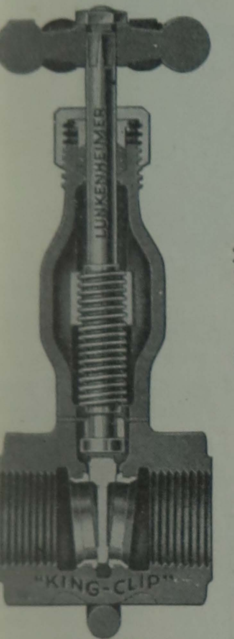
Lunkenheimer King-clip Iron Body Gate Valves

Bronze Mounted

Wedge Disc, Inside Screw

This valve gives equally satisfactory results on steam, oil, as, air, water and gasoline lines.

Bronze bushing in bonnet is an original Lunkenheimer eature. It provides a non-corrosive contact with bronze tem, protects stem threads and insures easy operation. The drain channels in bonnet are likewise original with Lunkenheimer.



No. 1640

Valves are repackable under pressure. Sizes 1/4 to 3-inch, inclusive, have bronze stuffing box nut; bronze gland provided in sizes 1 to 3-inch; larger sizes have bolted iron gland.

Pressure Ratings

Size Inches	Type	W.S.P. at 450° F. Lbs.	G.L.P. at 150° F. Lbs.
1/4 to 2	Screwed	150	225
2 1/2 to 4	Screwed	125	175
1 1/2 to 4	Flanged	125	175

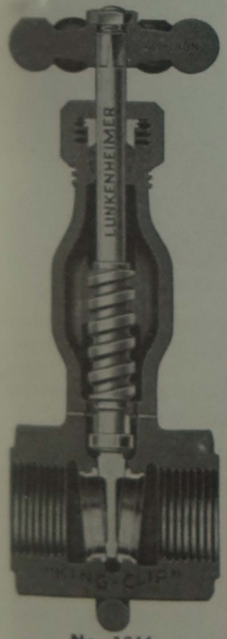
	Screwed		Flanged		
Size In.	No. 1640 Each	Face to Face In.	No. 1641 Each	Face to Face In.	Diam. Flange In.
1/4	$3.20	1 7/8	.....	...	...
3/8	3.20	2 1/16	.....	...	...
1/2	3.20	2 1/4	.....	...	...
3/4	3.60	2 5/8	.....	...	...
1	4.00	2 15/16	.....	...	...
1 1/4	5.50	3 5/16	.....	...	...
1 1/2	6.80	3 7/16	$15.00	6	5
2	10.00	4 1/16	18.00	7	6
2 1/2	18.00	4 5/8	26.50	7 1/2	7
3	22.50	4 15/16	30.00	8	7 1/2
3 1/2	50.00	6 13/16	55.00	8 1/2	8 1/2
4	50.00	6 13/16	55.00	9	9

Lunkenheimer King-Clip All Iron Gate Valves

Wedge Disc, Inside Screw

For use in handling solutions which attack bronze but not iron. All parts are made entirely of ferrous metals.

The All-Iron pattern has coarse, loose-fitting integral stem threads, providing quick operation. Ample clearance around stem and drainage channels cast in the bonnet permit passage of heavy fluids and prevent sticking of stem. Valves can be repacked under pressure.



No. 1644

Pressure Ratings

Size Inches	Type	W.S.P. at 450° F. Lbs.	G.L.P. at 150° F. Lbs.
1/4 to 2	Screwed	150	225
2 1/2 to 4	Screwed	125	175
1 1/2 to 4	Flanged	125	175

	Screwed		Flanged		
Size In.	No. 1644 Each	Face to Face In.	No. 1645 Each	Face to Face In.	Diam. Flanges In.
1/4	$3.50	1 7/8	.....	...	...
3/8	3.50	2 1/16	.....	...	...
1/2	3.50	2 1/4	.....	...	...
3/4	3.90	2 5/8	.....	...	...
1	4.30	2 15/16	.....	...	...
1 1/4	5.70	3 5/16	.....	...	...
1 1/2	7.00	3 7/16	$15.50	6	5
2	10.00	4 1/16	18.00	7	6
2 1/2	17.70	4 5/8	26.20	7 1/2	7
3	22.00	4 15/16	29.50	8	7 1/2
3 1/2	45.00	6 13/16	50.00	8 1/2	8 1/2
4	45.00	6 13/16	50.00	9	9

Lunkenheimer King-Clip Iron Body Gate Valves

Bronze Mounted

Wedge Disc, Quick Operating

KING-CLIP
LUNKENHEIMER

No. 1642
Screwed

These valves are applicable on steam, oil, gas, air, water and gasoline lines.

Thumbscrew at top of stem serves as a lock to hold disc at any desired position.

Disc is sharply tapered enabling handling of heavy fluids.

The steel clip, which secures bonnet to body, facilitates dismantling.

Pipe thread length will accommodate both American Standard and A.P.I. line pipe.

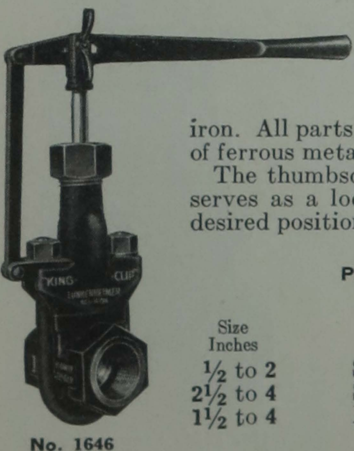
Pressure Ratings

Size Inches	Type	W.S.P. at 450° F. Lbs.	G.L.P. at 150° F. Lbs.
1/2 to 2	Screwed	150	225
2 1/2 to 4	Screwed	125	175
1 1/2 to 4	Flanged	125	175

	Screwed		Flanged		
Size In.	No. 1642 Each	Face to Face Inches	No. 1643 Each	Face to Face Inches	Diam. Flanges Inches
1/2	$7.00	2 1/4	.....	...	...
3/4	7.50	2 5/8	.....	...	...
1	8.00	2 15/16	.....	...	...
1 1/4	10.20	3 5/16	.....	...	...
1 1/2	12.50	3 7/16	$21.00	6	5
2	15.00	4 1/16	23.00	7	6
2 1/2	23.50	4 5/8	32.00	7 1/2	7
3	28.50	4 15/16	36.00	8	7 1/2
3 1/2	58.00	6 13/16	63.00	8 1/2	8 1/2
4	58.00	6 13/16	63.00	9	9

Lunkenheimer King-Clip All Iron Gate Valves

Wedge Disc, Quick Operating



No. 1646
Screwed

All Iron King-Clip Valves are for use in handling solutions which attack bronze but not iron. All parts are therefore made entirely of ferrous metals.

The thumbscrew at the top of the stem serves as a lock to hold the disc at any desired position.

Pressure Ratings

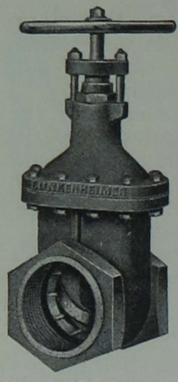
Size Inches	Type	W.S.P. at 450° F. Lbs.	G.L.P. at 150° F. Lbs.
1/2 to 2	Screwed	150	225
2 1/2 to 4	Screwed	125	175
1 1/2 to 4	Flanged	125	175

	Screwed		Flanged		
Size Inches	No. 1646 Each	Face to Face Inches	No. 1647 Each	Face to Face Inches	Diam. Flange Inches
1/2	$8.00	2 1/4	.....	...	...
3/4	8.50	2 5/8	.....	...	...
1	9.00	2 15/16	.....	...	...
1 1/4	11.00	3 5/16	.....	...	...
1 1/2	13.00	3 7/16	$21.50	6	5
2	15.00	4 1/16	23.00	7	6
2 1/2	23.00	4 5/8	31.50	7 1/2	7
3	27.60	4 15/16	35.30	8	7 1/2
3 1/2	52.00	6 13/16	57.00	8 1/2	8 1/2
4	52.00	6 13/16	57.00	9	9

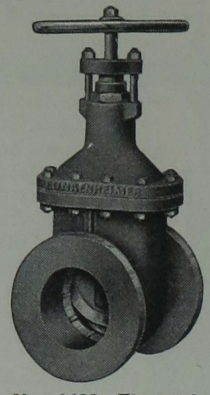
Lunkenheimer Iron Body Gate Valves

Bronze Mounted, Wedge Disc, Non-Rising Stem Inside Screw, Flanged Bonnet

125 Lbs. W.S.P., 450° F.
175 Lbs. G.L.P., 150° F.



No. 1427, Screwed



No. 1428, Flanged

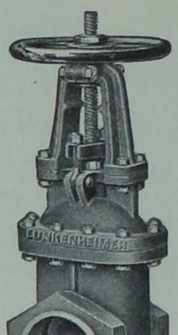
Stuffing box is repackable when valve is under pressure and full open. All parts renewable, including seat rings.

	No. 1427 Screwed		No. 1428 Flanged		
Size Inches	Each	Face to Face Inches	Each	Face to Face Inches	Diam. Flanges Inches
2	**$19.00**	5¼	**$22.00**	7	6
2½	**22.00**	5¾	**25.00**	7½	7
3	**26.00**	6 5/16	**30.00**	8	7½
3½	**34.00**	6⅝	**38.00**	8½	8½
4	**38.00**	7 1/16	**42.00**	9	9
4½	**51.00**	7⅜	**54.00**	9½	9¼
5	**55.00**	8	**58.00**	10	10
6	**65.00**	8¾	**68.00**	10½	11
7	.....	...	**95.00**	11	12½
8	.....	...	**105.00**	11½	13½
10	.....	...	**175.00**	13	16
12	.....	...	**275.00**	14	19

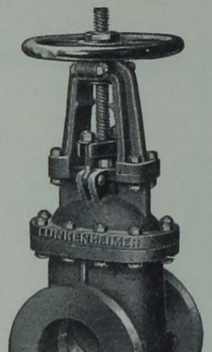
Lunkenheimer Iron Body Gate Valves

Bronze Mounted, Wedge Disc, Rising Stem Outside Screw, Flanged Bonnet and Yoke

125 Lbs. W.S.P., 450° F.
175 Lbs. G.L.P., 150° F.



No. 1429, Screwed



No. 1430, Flanged

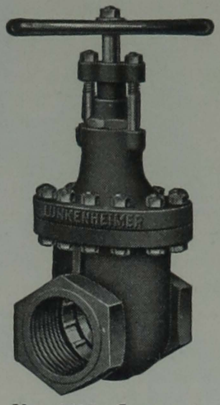
All parts renewable, including seat rings. Stuffing box repackable when valve is under pressure and full open.

	Face to Face Inches		Diam.	Price, Each			Face to	Diam.	No. 1430
Size In.	Scrd.	Flgd.	Flgs. In.	No. 1429 Scrd.	No. 1430 Flgd.	Size In.	Face Flgd. In.	Flgs. In.	Flgd. Price Each
2	5¼	7	6	**$33.00**	**$36.00**	**8**	11½	13½	**$160.00**
2½	5¾	7½	7	**37.00**	**40.00**	**10**	13	16	**240.00**
3	6 5/16	8	7½	**41.00**	**45.00**	**12**	14	19	**330.00**
3½	6⅝	8½	8½	**53.00**	**57.00**	**14**	15	21	**450.00**
4	7 1/16	9	9	**60.00**	**64.00**	**16**	16	23½	**625.00**
4½	7⅜	9½	9¼	**79.00**	**82.00**	**18**	17	25	**850.00**
5	8	10	10	**84.00**	**87.00**	**20**	18	27½	**1050.00**
6	8¾	10½	11	**95.00**	**98.00**	**24**	20	32	**1500.00**
7	...	11	12½	......	**140.00**	..	....	....	....

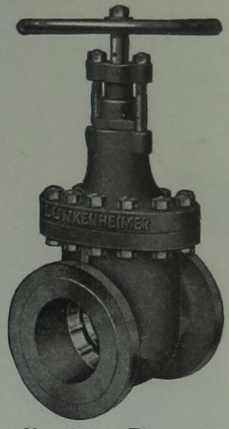
Lunkenheimer Iron Body Gate Valves

Bronze Mounted, Wedge Disc, Stationary Stem Inside Screw, Flanged Bonnet

250 Lbs. W.S.P., 450° F.
400 Lbs. G.L.P., 150° F.



No. 1433, Screwed



No. 1434, Flanged

All parts renewable, including seat rings. Stuffing box repackable when valve is under pressure and full open.

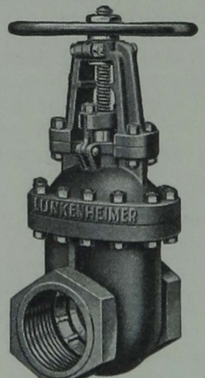
Disc accurately guided on machined guides. It does not drag over seat—no scoring or marring of seating surfaces.

	Face to Face Inches		Diam.	Price, Each			Face to	Diam.	No. 1434
Size In.	Scrd.	Flgd.	Flgs. In.	No. 1433 Scrd.	No. 1434 Flgd.	Size In.	Face Flgd. In.	Flgs. In.	Flgd. Price Each
1½	5½	7½	6⅛	**$44.00**	**$48.00**	**5**	15	11	**$160.00**
2	6	8½	6½	**46.00**	**50.00**	**6**	15⅞	12½	**180.00**
2½	6⅝	9½	7½	**56.00**	**60.00**	**7**	16¼	14	**250.00**
3	7¼	11⅛	8¼	**70.00**	**75.00**	**8**	16½	15	**280.00**
3½	7 15/16	11⅞	9	**95.00**	**100.00**	**10**	18	17½	**430.00**
4	8 9/16	12	10	**105.00**	**110.00**	**12**	19¾	20½	**600.00**
4½	...	13¼	10½	......	**150.00**	..	....	....	.....

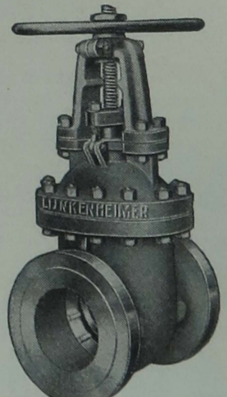
Lunkenheimer Iron Body Gate Valves

Bronze Mounted, Wedge Disc, Rising Stem Outside Screw, Flanged Bonnet and Yoke

250 Lbs. W.S.P., 450° F.
400 Lbs. G.L.P., 150° F.



No. 1435, Screwed



No. 1436, Flanged

All parts renewable; stuffing box repackable when valve is under pressure and full open. Disc accurately guided on machined guides.

Bronze to bronze contacts in yoke, gland and bottom of stuffing box prevent corrosion. No scoring of stem.

	No. 1435, Scrd.		No. 1436, Flanged			No. 1436, Flanged		
Size In.	Each	Face to Face Inches	Each	Face to Face Inches	Diam. Flgs. In.	Size In.	Each	Face to Face Inches	Diam. Flgs. In.
1½	**$64.00**	5½	**$68.00**	7½	6⅛	**6**	**$220.00**	15⅞	12½
2	**66.00**	6	**70.00**	8½	6½	**7**	**300.00**	16¼	14
2½	**76.00**	6⅝	**80.00**	9½	7½	**8**	**340.00**	16½	15
3	**95.00**	7¼	**100.00**	11⅛	8¼	**10**	**500.00**	18	17½
3½	**125.00**	7 15/16	**130.00**	11⅞	9	**12**	**700.00**	19¾	20½
4	**135.00**	8 9/16	**140.00**	12	10	**14**	**1000.00**	22½	23
4½	......	....	**180.00**	13¼	10½	**16**	**1400.00**	24	25½
5	......	....	**190.00**	15	11	**18**	**1900.00**	26	28

Lunkenheimer All Iron Gate Valves

Wedge Disc, Non-Rising Stem, Inside Screw

125 Lbs. W.S.P., 450° F.
175 Lbs. G.L.P., 150° F.

No. 1575, Screwed

No. 1576, Flanged

For use in handling cyanides, creosote, alkaline solutions, tc., such as attack bronze or brass alloys.

The disc is perfectly guided by ribs cast in the body which liminates dragging of the disc upon the seats. All parts are enewable. The stuffing box is repackable under pressure ith valve full open.

Size nches	Face to Face Inches		Diam. Flanges Inches	Price, Each	
	Screwed	Flanged		No. 1575 Screwed	No. 1576 Flanged
	5¼	7	6	$22.00	$25.00
½	5¾	7½	7	25.00	28.00
	6⁵⁄₁₆	8	7½	30.00	34.00
½	6⅝	8½	8½	39.00	43.00
	7¹⁄₁₆	9	9	43.00	47.00
	8	10	10	65.00	68.00
	8¾	10½	11	75.00	78.00

Lunkenheimer All Iron Gate Valves

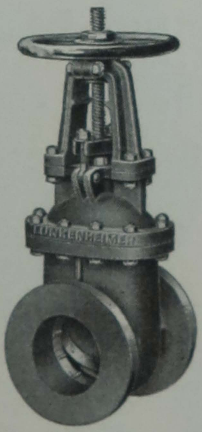
Wedge Disc, Rising Stem, Outside Screw

125 Lbs. W.S.P., 450° F.
175 Lbs. G.L.P., 150° F.
12 Inch and Smaller

No. 1577, Screwed

For use in handling cyanides, creosote, alkaline solutions, etc. such as attack bronze or brass alloys.

Disc is perfectly guided by ribs cast in body, which eliminates dragging of the disc upon the seats. All parts renewable.



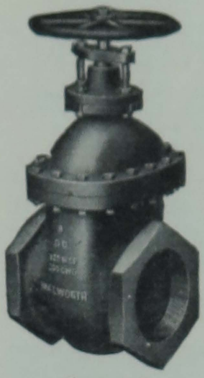
No. 1578, Flanged

Size Inches	Each		Face to Face Inches		Diam. Flanges Inches
	No. 1577 Screwed	No. 1578 Flanged	Screwed	Flanged	
2	$37.00	$40.00	5¼	7	6
2½	42.00	45.00	5¾	7½	7
3	46.00	50.00	6⁵⁄₁₆	8	7½
3½	63.00	67.00	6⅝	8½	8½
4	71.00	75.00	7¹⁄₁₆	9	9
5	97.00	100.00	8	10	10
6	107.00	110.00	8¾	10½	11
8	......	180.00	...	11½	13½
10	......	270.00	...	13	16
12	......	370.00	...	14	19
14	......	500.00	...	15	21
16	......	700.00	...	16	23½

Walworth Standard Iron Body Gate Valves

Double Disc Parallel Seat—Non-Rising Stem

125 Pounds Working Steam Pressure
200 Pounds Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures
350 Pounds Test Pressure



Screwed

Flanged

Can be repacked under pressure when wide open. Open to the left. Valves with clean-out pocket can be furnished. Prices upon application.

Flanged valves will be shipped faced only unless otherwise specified. When so ordered flanges will be drilled to the American 125-pound S.P. cast iron flange standard, A. S. A. No. B-16a-1928, at no extra charge. If drilled to any other standard, an extra charge will be made. Valves threaded for casing take an extra charge.

Size In.	Screwed		Flanged		
	No. 814 Bronze Mounted No. 815 All-Iron Each	End to End In.	No. 814F Bronze Mounted No. 815F All-Iron Each	Face to Face In.	Diam. Flange In.
2	$19.00	4⅞	$20.00	5⅝	6
2½	24.00	5⅞	25.00	6⅛	7
3	28.50	7	30.00	8	7½
4	36.00	7⅞	38.00	8⅝	9
5	48.50	11	51.00	10¾	10
6	57.00	11¾	60.00	11⅛	11
8	90.00	13½	90.00	13¼	13½
10	128.00	14¼	128.00	15	16
12	170.00	14¼	170.00	15½	19

No. 719, Screwed

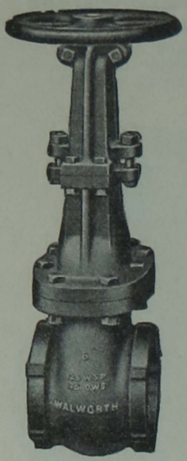
Walworth Standard Iron Body Gate Valves

Non-Rising Stem—Bronze Mounted Wedge Gate

Working Steam Pressures:
125 Pounds—12 Inches and Smaller
100 Pounds—14 Inches and Larger
Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures
175 Pounds—12 Inches and Smaller
150 Pounds—14 Inches and Larger

Can be repacked while under pressure if valve is wide open. Valves are shipped faced only unless otherwise ordered. All-iron gate valves furnished at same prices.

Size In.	Each		Face to Face Inches		Diam. Flanges In.
	No. 719 Screwed	No. 719 F Flanged	Screwed	Flanged	
2	$10.00	$12.00	5½	7	6
2½	11.50	13.50	5⅞	7½	7
3	14.00	16.50	6⅛	8	7½
3½	17.00	19.50	6½	8½	8½
4	19.00	23.00	6⅞	9	9
5	27.50	31.50	7⅜	10	10
6	32.50	36.50	8	10½	11
8	54.00	58.00	9⅛	11½	13½
10	90.00	95.00	10½	13	16
12	125.00	133.00	12	14	19
14	......	181.00	....	15	21
16	......	260.00	....	16	23½
18	......	350.00	....	17	25
20	......	425.00	....	18	27½
24	......	600.00	.. .	20	32



No. 725, Screwed

Walworth Standard Iron Body Gate Valves

Wedge Gate—Outside Screw and Yoke—Bronze Mounted

Working Steam Pressures: 125 Pounds, 12 Inches and Smaller; 100 Pounds, 14 Inches and Larger

Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures: 175 Pounds, 12 Inches and Smaller; 150 Pounds, 14 Inches and Smaller

With steel stem all sizes unless otherwise specified. Sizes 2 to 4 inches have solid yoke; 5 inches and larger, yoke bolted to bonnet; 2-inch size has all-bronze disc. Other sizes iron disc with bronze face rings. These valves open to the left.

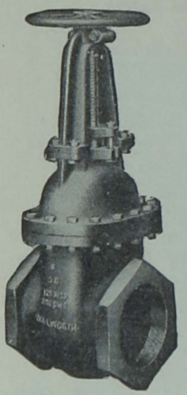
Can be repacked under pressure when wide open.

Size Inches	Each No. 725 Steel Stem	No. 726 Bronze Stem	No. 725F Steel Stem	No. 726F Bronze Stem	Face to Face Inches Screwed	Flanged	Diam. Flanges Inches
2	$17.50	$19.00	$19.50	$21.00	5½	7	6
2½	19.00	20.50	21.00	22.50	5⅞	7½	7
3	22.00	23.50	24.50	26.00	6⅛	8	7½
3½	25.00	27.00	27.50	29.50	6½	8½	8½
4	30.00	32.50	34.00	36.50	6⅞	9	9
5	42.00	45.00	46.00	49.00	7⅜	10	10
6	48.00	52.00	52.00	56.00	8	10½	11
8	80.00	86.00	84.00	90.00	9⅛	11½	13½
10	122.00	131.00	127.00	136.00	10½	13	16
12	160.00	172.00	168.00	180.00	12	14	19
14	......	......	236.00	255.00	....	15	21
16	......	......	325.00	350.00	....	16	23½
18	......	......	435.00	470.00	....	17	25
20	......	......	525.00	565.00	....	18	27½
24	......	......	725.00	775.00	....	20	32

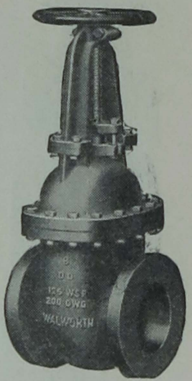
Walworth Standard Iron Body Gate Valves

Double Disc Parallel Seat—Outside Screw and Yoke

125 Pounds Working Steam Pressure
200 Pounds Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Temperatures
350 Pounds Test Pressure



Screwed



Flanged

Sizes 2 to 4-inch have solid yoke; 5-inch and larger have yoke bolted to bonnet.

Valves with clean-out can be furnished; prices on application.

Open to the left.

Flanged valves will be shipped faced only unless otherwise specified, but when so ordered flanges will be drilled to American 125-lb. S.P. cast iron flange standard, A.S.A. No. B-16a-1928 at no extra charge. An extra charge will be made if drilled to any other standard.

Valves threaded for casing take an extra charge.

Can be repacked under pressure when wide open.

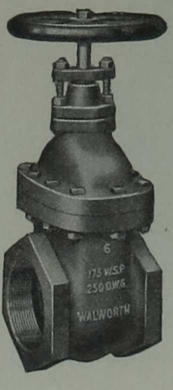
Size In.	Screwed No. 820 Bronze Mounted No. 821 All-Iron Each	End to End In.	Flanged No. 820F Bronze Mounted No. 821F All-Iron Each	Face to Face In.	Diam. Flange In.
2	$25.00	4⅞	$26.00	5⅝	6
2½	31.50	5⅞	32.50	6⅛	7
3	36.00	7	37.50	8	7½
4	45.50	7⅞	47.50	8⅝	9
5	61.50	11	64.00	10¾	10
6	72.00	11¾	75.00	11⅛	11
8	112.00	13½	112.00	13¼	13½
10	160.00	14¼	160.00	15	16
12	212.00	14¼	212.00	15½	19

Walworth Medium Iron Body Gate Valves

Bronze Mounted

Wedge Gate—Non-Rising Bronze Stem

175 Pounds Working Steam Pressure
250 Pounds Non-Shock Working Oil, Water, or Gas Pressures, at Ordinary Air Temperatures
500 Pounds Hydrostatic Pressure Test



Screwed

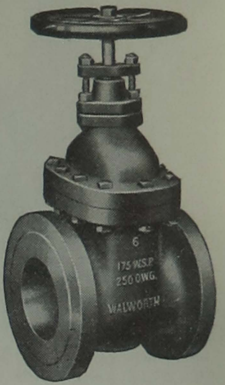
Can be repacked under pressure when wide open.

Valves are regularly furnished with bronze stem and seat rings. Disc is cast iron bronze faced.

Valves 6 inches or larger can be furnished with by-pass when so ordered.

These valves open to the left.

Medium flanged gate valves are furnished with 1/16-inch raised face.



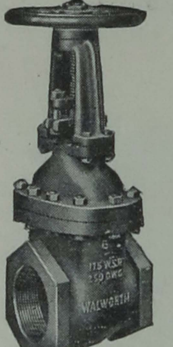
Flanged

Size In.	Screwed No. 760 Each	End to End In.	Flanged No. 760F Each	No. 761F With By-Pass Each	Face to Face In.	Diam. Flange In.
2	$15.00	5½	$17.50	......	7½	6½
2½	17.00	6	19.50	......	8	7½
3	20.00	7¼	23.00	......	9½	8¼
3½	25.00	7½	28.00	......	10	9
4	28.00	7¾	33.00	......	10½	10
5	40.00	8½	45.00	......	11½	11
6	50.00	8¾	57.00	$85.00	12	12½
8	87.00	10	94.00	125.00	13½	15
10	145.00	11½	153.00	185.00	15	17½
12	185.00	12½	195.00	230.00	16	20½

Walworth Medium Iron Body Gate Valves

Bronze Mounted—Wedge Gate Outside Screw and Yoke

175 Pounds Working Steam Pressure
250 Pounds Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperature
500 Pounds Hydrostatic Pressure Test



Screwed

Can be repacked under pressure when wide open.

Regularly furnished with cold rolled steel stem; bronze stems can be supplied. Bronze seat rings and cast iron disc, bronze faced. Valves open to the left.

Valves 6 inches and larger, with by-pass when specified. Medium flanged gate valves with 1/16-inch raised face.

Screwed

Size In.	Each No. 766 Steel Stem	No. 767 Bronze Stem	End to End In.	Size In.	Each No. 766 Steel Stem	No. 767 Bronze Stem	End to End In.
2	$23.00	$24.50	5½	5	$54.00	$57.00	8½
2½	25.00	26.50	6	6	65.00	69.00	8¾
3	29.00	30.50	7¼	8	110.00	116.00	10
3½	35.00	37.00	7½	10	170.00	179.00	11½
4	40.00	42.50	7¾	12	215.00	227.00	12½

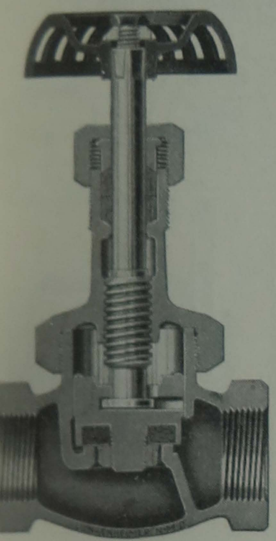
Flanged

Size In.	Steel Stem, Each No. 766F	No. 768F With By-Pass	Bronze Stem, Each No. 767F	No. 769F With By-Pass	Face to Face In.	Diam. Flange In.
2	$25.50	......	$27.00	......	7½	6½
2½	27.50	......	29.00	......	8	7½
3	32.00	......	33.50	......	9½	8¼
3½	38.00	......	40.00	......	10	9
4	45.00	......	47.50	......	10½	10
5	59.00	......	62.00	......	11½	11
6	72.00	$100.00	76.00	$104.00	12	12½
8	117.00	148.00	123.00	154.00	13½	15
10	178.00	210.00	187.00	219.00	15	17½
12	225.00	260.00	237.00	272.00	16	20½

Lunkenheimer Bronze N-M-D Valves

(Non-Metallic Disc)

150 Lb. W.S.P., 300 Lb. G.L.P.



No. 123 Globe

These valves have specially compounded non-metallic discs for maximum life on steam, hot water, cold water, air and gas, which can be easily and quickly renewed.

Steam thread pitches in all sizes designed to permit tight closure without crushing the disc.

The disc holder is of the slip-on type. Slightly opening the valve prevents disc holder from dropping off when disassembling the valve. Four guides in disc holder provide an extremely long and wide guiding contact.

Sturdy screw-over bonnet provides great strength and facilitates reassembling the valve, as the trimming assembly can be held in one hand and screwed on the body with ease.

Extra long pipe threads in body and ample clearance at end of threads permit a tight joint without danger of pipe ends jamming against diaphragm.

Hexagon head gland permits application of a wrench to raise gland without prying.

A non-heat handwheel is designed to prevent burning the hand. Easy to grip.

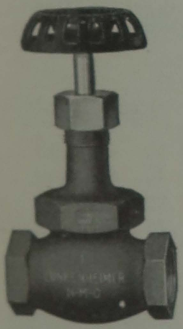
Every valve is individually tested to insure satisfactory performance in service.

These valves are regularly available in several designs, globe, angle, horizontal and angle check, spring check for compressor service and quick operating.

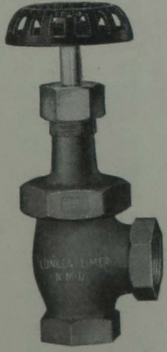
Lunkenheimer Bronze N-M-D Globe and Angle Valves

Inside Screw—Screwed Bonnet—Non-Metallic Disc

Screwed: 150 Lbs. W.S.P., 300 Lbs. G.L.P.
Flanged: 150 Lbs. W.S.P., 225 Lbs. G.L.P.



No. 123, Globe



No. 214, Angle

Orders should specify whether discs are for steam, hot water, cold water, gas, or air.

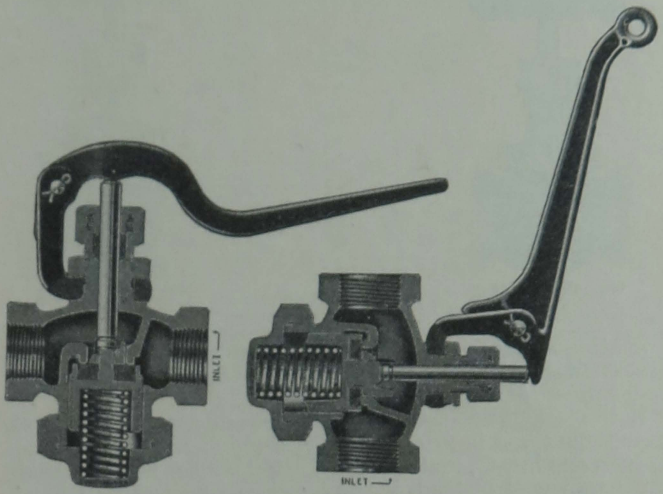
It is recommended that valves on open end steam lines be installed with pressure above the disc.

	Screwed		Flanged				
Size Inches	No. 123 Globe Each	No. 214 Angle Each	No. 124 Globe Each	No. 215 Angle Each	Face to Face Inches	Center to Face Inches	Diam. Flanges Inches
1/8	$2.20	$2.20	.....	.....	...	....	...
1/4	2.20	2.20	.....	.....	...	....	...
3/8	2.50	2.50	.....	.....	...	....	...
1/2	3.00	3.00	.....	.....	...	....	...
3/4	4.00	4.00	$10.80	$10.80	3 7/8	2 7/16	3 7/8
1	5.00	5.00	12.50	12.50	4 3/8	2 11/16	4 1/4
1 1/4	7.00	7.00	19.00	19.00	4 7/8	2 7/8	4 5/8
1 1/2	10.00	10.00	23.00	23.00	5 1/2	3 3/16	5
2	16.00	16.00	35.00	35.00	6 1/2	3 3/4	6
2 1/2	28.00	28.00	54.00	54.00	7 1/2	4 5/16	7
3	40.00	40.00	72.00	72.00	8 7/8	4 5/8	7 1/2

Lunkenheimer Bronze N-M-D Quick Operating Valves

Screwed—Stainless Steel Spring—Non-Metallic Disc

150 Lbs. Pressure



No. 1837
Grip Lever

No. 1836
Pull Lever

Orders should specify whether discs are for steam, hot water, cold water, gas, or air.

Size Inches	No. 1836 Each	No. 1837 Each	Size Inches	No. 1836 Each
1/4	$5.50	$5.50	1	$11.00
3/8	6.00	6.00	1 1/4	14.00
1/2	7.00	7.00	1 1/2	19.00
3/4	9.00	....	2	26.00

Lunkenheimer Non-Metallic Discs

For N-M-D Valves

No. 10 STEAM
1 N-M-D

No. 10

No. 20 STEAM-HOT WATER
1 N-M-D

No. 20

No. 30 COLD WATER-GAS-AIR
1 N-M-D

No. 30

Each disc is compounded for maximum wear and tightness in its particular service.

Globe and angle valves can be furnished with Nos. 10, 20, and 30 discs.

No. 10 disc is for saturated steam to 150 pounds.

No. 20 disc is for hot water to 250 pounds at 250° F., to 300 pounds at 150° F.; saturated steam to 150 pounds in check and quick operating valves.

In globe and angle valves, No. 20 disc may be used for saturated steam to 150 pounds where scale is present in the steam.

No. 30 disc is for cold water, gas, and air up to 300 pounds.

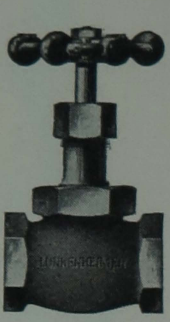
Discs of each size and kind are furnished in packages of one dozen each. Discs for 1/8 to 1 1/4-inch valves are furnished in standard cartons of 6 packages; for 1 1/2 and 2-inch valves in standard cartons of 3 packages.

Size Valve Inches	No. 10 Disc Each	Nos. 20 and 30 Discs Each	Size Valve Inches	No. 10 Disc Each	Nos. 20 and 30 Discs Each
1/8 & 1/4	$.12	$.08	1 1/4	$.33	$.24
3/8	.14	.09	1 1/2	.44	.32
1/2	.15	.10	2	.66	.48
3/4	.18	.12	2 1/2	.90	.64
1	.22	.15	3	1.50	1.00

Lunkenheimer Bronze Regrinding Globe, Angle and Cross Valves

Union Bonnet

200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.



No. 407, Globe

LUNKENHEIMER

No. 408, Angle

Seating surfaces are regrindable; disc and all other parts are renewable; stuffing box can be repacked when valves are under pressure and full open.

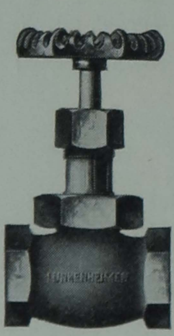
In the ½-inch and smaller sizes, disc and stem are integral; the stuffing box is provided with a gland follower in sizes ¾-inch and larger, and a round slotted bonnet ring and plain rim handwheel instead of the hexagon ring and ball handwheel are furnished in sizes 2½-inch and larger.

Size Inches	Screwed No. 407 Globe Each	Screwed No. 408 Angle Each	Screwed No. 588 Cross Each
⅛	$.70	$.70	$1.00
¼	.70	.70	1.00
⅜	.85	.85	1.00
½	1.15	1.15	1.50
¾	1.45	1.45	2.00
1	2.00	2.00	2.70
1¼	2.80	2.80	3.50
1½	$3.90	$3.90	$5.10
2	6.20	6.20	8.00
2½	12.00	12.00	16.00
3	16.50	16.50	24.00

Lunkenheimer Bronze Regrinding Globe, Angle and Cross Valves

Union Bonnet

300 Lbs. W. S. P., 550° F
600 Lbs. G. L. P., 150° F.



No. 409, Globe

LUNKENHEIMER

No. 557, Angle

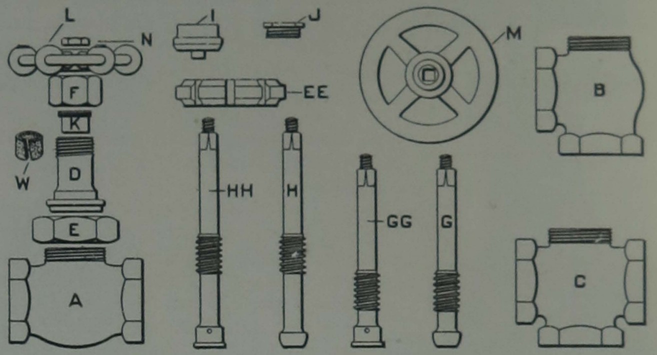
Seating surfaces are regrindable; disc and all other parts are renewable; stuffing box can be repacked when valves are under pressure and full open.

In the ½-inch and smaller sizes, disc and stem are integral; the stuffing box is provided with a gland follower in all sizes. A round slotted bonnet ring and plain rim handwheel are furnished on sizes 2½-inch and larger.

Size Inches	Screwed No. 409 Globe Each	Screwed No. 557 Angle Each	Screwed No. 620 Cross Each
¼	$.90	$.90	$1.20
⅜	1.10	1.10	1.30
½	1.50	1.50	1.90
¾	2.30	2.30	2.90
1	3.60	3.60	4.50
1¼	$5.10	$5.10	$6.30
1½	7.10	7.10	8.60
2	10.90	10.90	13.10
2½	19.50	19.50	23.40
3	29.00	29.00	34.50

Parts for Lunkenheimer Bronze Regrinding Globe, Angle and Cross Valves

Nos. 407, 408, 580, 581, 582 and 588



Orders should specify symbol of the part required, and size and figure number of the valve for which part is intended.

Size Valve Inches	Price, Each — Screwed Ends — Bodies for Valves — A Globe	B Angle	C Cross	D Bonnets	E Hexagonal Bonnet Rings	EE Round Slotted Bonnet Rings
⅛	$.35	$.35	$.50	$.15	$.13	....
¼	.35	.35	.50	.18	.13	....
⅜	.42	.42	.50	.20	.15	....
½	.58	.58	.75	.25	.20	....
¾	.73	.73	1.00	.30	.25	....
1	1.00	1.00	1.35	.45	.35	....
1¼	1.40	1.40	1.75	.70	.45	....
1½	1.95	1.95	2.55	.90	.70	....
2	3.10	3.10	4.00	1.10	1.00	....
2½	6.00	6.00	8.00	2.20	....	$1.80
3	8.25	8.25	12.00	3.90	....	2.50

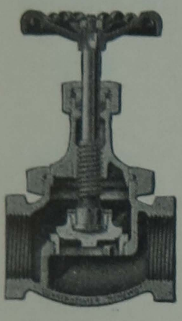
Size Valve Inches	Price, Each — F Stuffing Boxes	Stems with Disc Integral for Small Size Valves — G Globe	Stems with Disc Integral for Small Size Valves — H Angle or Cross	Stems for Large Size Valves — GG Globe	Stems for Large Size Valves — HH Angle or Cross	I Discs
⅛	$.09	$.16	$.16	....	....	....
¼	.10	.18	.18	....	....	....
⅜	.11	.20	.20	....	....	....
½	.18	.27	.27	....	....	....
¾	.22	...	...	$.30	$.30	$.15
1	.25	...	...	.40	.40	.18
1¼	.27	...	...	.55	.55	.25
1½	.30	...	...	.75	.75	.35
2	.40	...	...	1.10	1.10	.60
2½	.70	...	...	1.45	1.45	1.10
3	1.00	...	...	2.55	2.55	2.35

Size Valve Inches	Price, Each — J Disc Locknuts	K Glands for Stuffing Box	Iron Handwheels — L Ball Pattern	Iron Handwheels — M Plain Rim	N Brass Handwheel Locknuts	Trimmings Complete without Body, for Globe, Angle and Cross Valves, per Set
⅛	...	...	$.09	....	$.05	$.40
¼	...	...	.12	....	.05	.45
⅜	...	...	.12	....	.06	.45
½	...	...	.13	....	.06	.55
¾	$.05	$.10	.17	....	.07	.75
1	.07	.11	.17	....	.07	1.35
1¼	.10	.16	.20	....	.07	1.85
1½	.12	.18	.22	....	.09	2.60
2	.15	.22	.35	....	.11	4.10
2½	.20	.35	...	$.55	.15	8.00
3	.35	.45	...	.80	.25	11.00

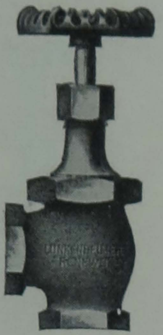
Lunkenheimer Renewo Bronze Globe, Angle and Cross Valves

Renewable Nickel Alloy Seat and Disc
Union Bonnet

200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.



No. 73, Globe



No. 72, Angle

Seating surfaces are regrindable; the nickel alloy seat and lisc and all other parts are renewable.

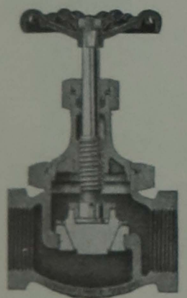
The stuffing box is provided with a gland follower in sizes ¼-inch and larger; a slotted bonnet ring is furnished instead f the hexagon ring on sizes 2-inch and larger; self-cooling nalleable iron handwheel is provided on sizes up to 2-inch, nclusive, larger sizes having plain rim handwheel.

	Screwed				Screwed		
ize nches	No. 73 Globe Each	No. 72 Angle Each	No. 71 Cross Each	Size Inches	No. 73 Globe Each	No. 72 Angle Each	No. 71 Cross Each
¼	$1.10	$1.10	$1.70	1¼	$4.00	$4.00	$4.75
⅜	1.25	1.25	2.00	1½	5.50	5.50	6.25
½	1.60	1.60	2.25	2	8.75	8.75	9.50
¾	2.20	2.20	2.50	2½	15.75	15.75	20.00
1	2.80	2.80	3.25	3	22.00	22.00	27.50

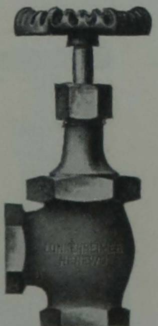
Lunkenheimer Renewo Plug Type Bronze Globe and Angle Valves

Renewable Nickel Alloy Seat and Disc
Union Bonnet

200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.



No. 73-P, Globe



No. 72-P, Angle

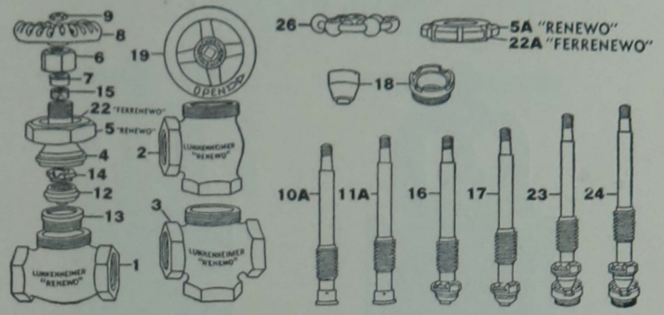
For throttling, drain and other service demanding maximum resistance to destructive action on valve seat bearings.

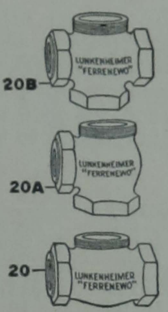
The seat and disc alloy is a non-galling, non-ferrous composition of great hardness (300 Brinell); resistant to wear, abrasion, erosion and corrosion, and retains its hardness at high temperature.

Size Inches	No. 73-P Globe Each	No. 72-P Angle Each	Size Inches	No. 73-P Globe Each	No. 72-P Angle Each
¼	$2.50	$2.50	1¼	$7.00	$7.00
⅜	2.50	2.50	1½	10.00	10.00
½	3.00	3.00	2	14.50	14.50
¾	4.00	4.00	2½	27.00	27.00
1	5.00	5.00	3	40.00	40.00

Parts for Lunkenheimer Renewo and Ferrenewo Valves

Globe, Angle and Cross
Nos. 68, 69, 70, 71, 72, 73, 1021, 1022, 1023, 72-P, 73-P, 1021-P, 1022-P





1	Renewo Globe Body, with Full-Way Seat
2	Renewo Angle Body, with Full-Way Seat
3	Renewo Cross Body, with Full-Way Seat
4	Bronze Bonnet
5	Renewo Bronze Hexagonal Bonnet Ring
5A	Renewo Bronze Round Slotted Bonnet Ring
6	Bronze Stuffing Box
7	Bronze Gland for Stuffing Box
8	Renewo Non-Heat Malleable Iron Hand Wheel
9	Brass Hand Wheel Locknut
10A	Stem for Globe Valves
11A	Stem for Angle and Cross Valves
12	Disc } Full-Way Nickel Alloy
13	Seat } Full-Way Nickel Alloy
14	Bronze Disc Locknut
16	Full-Way Nickel Alloy Disc-Locknut-Stem Assembly for Globe Valves
17	Full-Way Nickel Alloy Disc-Locknut-Stem Assembly for Angle Valves
18	Plug Type Nickel Alloy Seat-Disc Set
19	Renewo Plain Rim Hand Wheel
20	Ferrenewo Globe Body with Full-Way Seat
20A	Ferrenewo Angle Body with Full-Way Seat
20B	Ferrenewo Cross Body with Full-Way Seat
22	Ferrenewo Bronze Hexagonal Bonnet Ring
22A	Ferrenewo Bronze Round Slotted Bonnet Ring
23	Plug Type Nickel Alloy Seat-Disc-Locknut Stem Assembly for Globe Valves
24	Plug Type Nickel Alloy Seat-Disc-Locknut Stem Assembly for Angle Valves
26	Ferrenewo Iron Ball Pattern Hand Wheel

Orders should specify symbol of the part required and size and figure number of the valve for which part is intended.

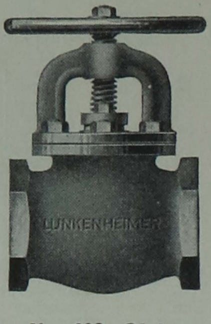
Prices of stem packing, upon application.

	Size of Valve, Inches									
Part No.	¼ Each	⅜ Each	½ Each	¾ Each	1 Each	1¼ Each	1½ Each	2 Each	2½ Each	3 Each
1	$.55	$.65	$.80	$1.10	$1.40	$2.00	$2.75	$4.50	$8.00	$11.00
2	.55	.65	.80	1.10	1.40	2.00	2.75	4.50	8.00	11.00
3	.85	1.00	1.10	1.25	1.60	2.40	3.10	4.75	10.00	13.75
4	.25	.25	.30	.55	.75	.95	1.20	2.00	3.00	4.00
5	.25	.25	.30	.40	.60	.85	1.20	....	....	.....
5A	....	....	....	....	....	....	....	1.50	2.30	3.00
6	.15	.15	.18	.20	.25	.30	.35	.40	.60	.80
7	....	....	....	.10	.10	.12	.15	.25	.35	.45
8	.15	.15	.17	.20	.25	.30	.35	.45	....	.....
9	.05	.05	.05	.06	.06	.07	.07	.10	.12	.12
10A	.30	.30	.35	.40	.60	.75	.90	1.20	1.80	2.50
11A	.30	.30	.35	.40	.60	.75	.90	1.20	1.80	2.50
12	.40	.40	.45	.55	.70	.95	1.30	2.00	4.00	6.00
13	.45	.45	.50	.55	.65	.90	1.30	2.00	3.20	4.50
14	.08	.08	.08	.09	.09	.13	.15	.20	.25	.35
16	1.00	1.00	1.15	....	....	....	....	....	....	.....
17	1.00	1.00	1.15	....	....	....	....	....	....	.....
18	1.30	1.30	1.50	1.70	2.10	2.60	3.40	4.70	12.00	14.00
19	....	....	....	....	....	....	....	....	.85	1.00
20	.55	.60	.70	.90	1.10	1.50	2.00	3.10	....	.....
20A	.55	.60	.70	.90	1.10	1.50	2.00	3.10	....	.....
20B	.75	.80	.90	1.10	1.30	1.80	2.40	3.60	....	.....
22	.30	.30	.35	.45	.70	.95	1.40	....	....	.....
22A	....	....	....	....	....	....	....	1.75	....	.....
23	1.95	1.95	2.25	....	....	....	....	....	....	.....
24	1.95	1.95	2.25	....	....	....	....	....	....	.....
26	.15	.15	.17	.20	.22	.25	.30	.45	....	.....
Trimmings Complete for Renewo Full-Way Valves										
....	.80	.80	1.05	1.45	1.85	2.65	3.65	5.80	10.50	14.65
Steel Wrenches for Full-Way Seat Rings										
....	1.00	1.00	1.10	1.20	1.50	1.90	2.50	4.00	5.50	8.00
Bronze Wrench Guides for Full-Way Valves										
....	.30	.30	.35	.45	.55	.70	1.00	1.40	2.20	3.00
Steel Wrenches for Plug Type Seat Rings										
....	3.00	3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	10.00

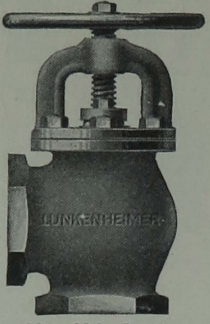
Lunkenheimer Bronze Regrinding Globe, Angle and Cross Valves

Outside Screw, Flanged Yoke Bonnet

200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.



No. 693, Globe



No. 694, Angle

Seating surfaces are regrindable; the disc and all other parts are renewable; the stuffing box can be repacked when valves are under pressure and full open; areas throughout the body are in excess of that of the connecting pipe; the threads on the bronze stem do not come in contact with the steam and, being accessible for oiling, wear is reduced to the minimum.

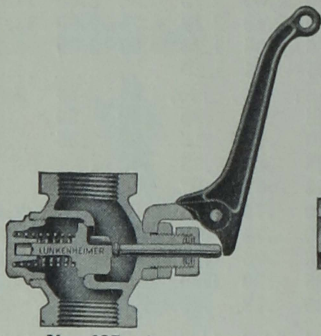
Size Inches	Face to Face, Globe Inches	Center to Face, Angle or Cross Inches	Screwed No. 693 Globe Each	Screwed No. 694 Angle Each	Screwed No. 695 Cross Each
1½	5	2½	$12.00	$12.00	$14.00
2	5¾	2⅞	15.50	15.50	18.00
2½	6 11/16	3⅜	18.00	18.00	21.00
3	7⅜	3¾	26.00	26.00	31.00
3½	7 13/16	3 15/16	37.00	37.00	44.00
4	9	4⅝	47.00	47.00	56.00

Lunkenheimer Bronze Regrinding Quick Operating Valves

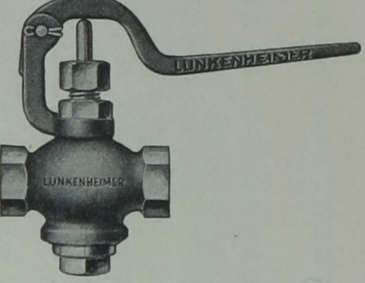
With Stuffing Box—Stainless Steel Spring

Screw Ends

200 Lbs. W.S.P.



No. 635



No. 1240

These valves are suitable for steam, gas or liquid lines at pressures up to 200 pounds. They are provided with stuffing box and are regrindable.

Fig. 635 is intended for hand operation as well as by cord or chain. The lever is reversible and adjustable for horizontal, vertical or oblique operation.

Fig. 1240 is designed for hand gripping. It is given extra grinding and test and is expressly intended for air service.

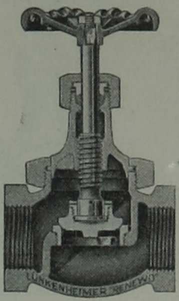
Both types should be installed with pressure on the spring side of the disc.

Size.......in.	¼	⅜	½	¾	1	1¼	1½	2
No. 635..each	$2.30	2.50	3.20	4.30	8.50	10.00	14.00	20.00
No.1240.each	$5.50	6.00	7.00	....	....	.....	.....	.....
Face to Face ....in.	2⅛	2 3/16	2½	3	3 7/16	4	4⅜	5 5/16
Center to Bottom of Cap ....in.	1⅛	1⅛	1¼	1½	1 13/16	2 1/16	2¼	2¾

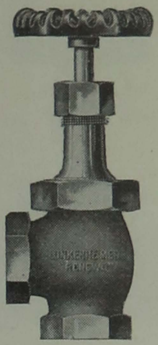
Lunkenheimer Renewo Bronze Globe, Angle and Cross Valves

Renewable Nickel Alloy Seat and Disc Union Bonnet

300 Lbs. W.S.P., 550° F.
600 Lbs. G.L.P., 150° F.



No. 16, Globe



No. 17, Angle

Seating surfaces are regrindable; the nickel alloy seat and disc and all other parts are renewable.

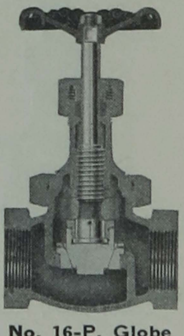
The stuffing box is provided with a gland follower in all sizes; a slotted bonnet ring is furnished instead of the hexagon ring on sizes 2-inch and larger; self-cooling malleable iron handwheel is provided on sizes up to 2-inch, inclusive, larger sizes having plain rim handwheel.

Size Inches	Screwed No. 16 Globe Each	Screwed No. 17 Angle Each	Screwed No. 18 Cross Each	Size Inches	Screwed No. 16 Globe Each	Screwed No. 17 Angle Each	Screwed No. 18 Cross Each
¼	$1.60	$1.60	$2.10	1¼	$6.50	$6.50	$7.80
⅜	1.70	1.70	2.30	1½	9.00	9.00	10.50
½	2.50	2.50	3.40	2	14.00	14.00	16.00
¾	3.80	3.80	4.60	2½	25.00	25.00	29.00
1	4.90	4.90	6.00	3	36.00	36.00	42.00

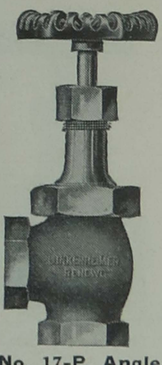
Lunkenheimer Renewo Plug Type Bronze Globe and Angle Valves

Renewable Nickel Alloy Seat and Disc Union Bonnet

300 Lbs. W.S.P., 550° F.
600 Lbs. G.L.P., 150° F.



No. 16-P, Globe



No. 17-P, Angle

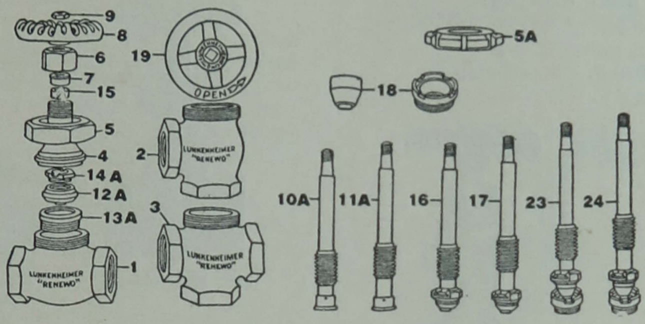
For throttling, drain and other service demanding maximum resistance to destructive action on valve seat bearings.

The seat and disc alloy is a non-galling, non-ferrous composition of great hardness (300 Brinell); resistant to wear, abrasion, erosion and corrosion, and retains its hardness at high temperature.

Size Inches	No. 16-P Globe Each	No. 17-P Angle Each	Size Inches	No. 16-P Globe Each	No. 17-P Angle Each
¼	$3.00	$3.00	1¼	$9.50	$9.50
⅜	3.00	3.00	1½	13.50	13.50
½	4.00	4.00	2	19.50	19.50
¾	5.00	5.00	2½	36.50	36.50
1	7.00	7.00	3	50.00	50.00

Repair Parts for Lunkenheimer Extra Heavy Renewo Globe, Angle, and Cross Valves

Nos. 16, 17, 18, 19, 20, 21, 16-P, 17-P



When ordering, specify part No., size and the No. of the valve for which the part is intended.

The bodies listed are bronze with renewable full-way Nickel Alloy Seat Ring.

Part No.	Description	Each — Size Valve, Inches									
		¼	⅜	½	¾	1	1¼	1½	2	2½	3
1	Screw End Body for No. 16 Globe Valve	$.80	$.85	$1.25	$1.90	$2.45	$3.25	$4.50	$7.00	$12.50	$18.00
2	Screw End Body for No. 17 Angle Valve	.80	.85	1.25	1.90	2.45	3.25	4.50	7.00	12.50	18.00
3	Screw End Body for No. 18 Cross Valve	1.30	1.45	2.15	2.70	3.55	4.55	6.00	9.00	16.50	24.00
4	Bonnets, Bronze	.45	.45	.50	.75	.95	1.30	1.70	3.00	4.00	5.50
5	Hexagonal Bonnet Rings, Bronze	.35	.35	.40	.50	.70	1.10	1.50	....	.....	.....
5A	Round Bonnet Rings, Slotted, Bronze	....	....	....	....	....	....	....	2.50	3.50	5.00
6	Stuffing Boxes, Bronze	.20	.20	.23	.25	.30	.40	.50	.60	1.00	1.30
7	Gland Followers, Bronze	.10	.10	.10	.12	.15	.17	.20	.30	.60	1.00
8	Non-Heat, Malleable Iron Handwheels	.20	.20	.22	.25	.30	.35	.45	.60	.....	.....
19	Plain Rim, Cast-Iron Handwheels	....	....	....	....	....	....	....	....	1.30	1.80
9	Locknuts, Bronze, Handwheel	.05	.05	.06	.06	.07	.07	.10	.12	.12	.16
10A	Stems, Bronze, for Globe Valves	.45	.45	.50	.60	.80	1.00	1.20	1.60	2.40	4.00
11A	Stems, Bronze, for Angle and Cross Valves	.45	.45	.50	.60	.80	1.00	1.20	1.60	2.40	4.00
....	Adjustable Spanner Wrenches, No. 654	....	....	....	....	....	....	....	2.50	2.50	3.50
*15	Stem Packing	....	....	....	....	....	....	....	....	.....	.....

Full-Way Type

Part No.	Description	¼	⅜	½	¾	1	1¼	1½	2	2½	3
12A	Nickel Alloy Discs	$.40	$.40	$.45	$.65	$.85	$1.20	$1.60	$3.50	$5.50	$8.00
13A	Nickel Alloy Seat Rings	.45	.45	.50	.55	.65	.90	1.30	2.90	3.20	4.50
14A	Disc Locknuts, Bronze	.08	.08	.08	.10	.10	.15	.20	.25	.40	.60
16	Nickel Alloy Disc-Locknut-Stem Assembly for Globe Valves per set	1.45	1.45	1.60	....	....	....	....	....	.....	.....
17	Nickel Alloy Disc-Locknut-Stem Assembly for Angle Valves per set	1.45	1.45	1.60	....	....	....	....	....	.....	.....
....	Seat Ring Wrenches, Steel, No. 1302	1.00	1.00	1.10	1.20	1.50	1.90	2.50	4.00	5.50	8.00
....	Wrench Guides, Bronze, No. 1303	.30	.30	.35	.45	.55	.70	1.00	1.40	2.20	3.00

Plug Type

Part No.	Description	¼	⅜	½	¾	1	1¼	1½	2	2½	3
18	Nickel Alloy Seat-Disc Set per set	$1.30	$1.30	$1.50	$1.80	$2.20	$2.80	$3.60	$5.25	$13.00	$15.00
14A	Disc Locknuts, Bronze	.08	.08	.08	.10	.10	.15	.20	.25	.40	.60
23	Nickel Alloy Seat-Disc-Locknut-Stem Assembly for Globe Valves per set	2.15	2.15	2.45	....	....	....	....	....	.....	.....
24	Nickel Alloy Seat-Disc-Locknut-Stem Assembly for Angle Valves per set	2.15	2.15	2.45	....	....	....	....	....	.....	.....
....	Seat Ring Wrenches, Steel, No. 1672	3.00	3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	10.00

Trimmings Complete

Part No.	Description	¼	⅜	½	¾	1	1¼	1½	2	2½	3
39	Trimmings Complete, All Parts Except Body and Seat Ring, for Full-Way Globe, Angle, and Cross Valves per set	$1.10	$1.10	$1.65	$2.55	$3.25	$4.35	$6.00	$9.35	$16.65	$24.00

No. 93 Regrinding Compound

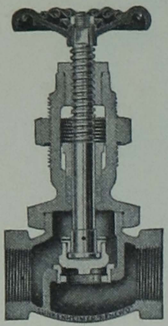
No. 93 Regrinding Compound, 5-Ounce Can (2½ Oz. Coarse, 2½ Oz. Fine)............each **$1.20**

*Prices upon application.

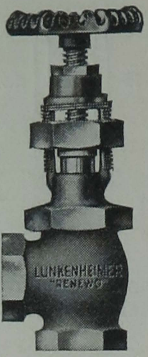
Lunkenheimer Renewo Bronze Globe and Angle Valves

Renewable Nickel Alloy Seat and Disc
Screwed Yoke

300 Lbs. W.S.P., 550° F.
600 Lbs. G.L.P., 150° F.



No. 1690, Globe



No. 1691, Angle

The seating material is a hard, wear-resisting nickel alloy.

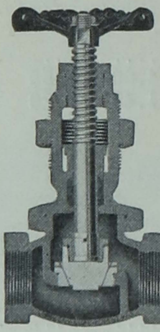
Seating surfaces are regrindable. The nickel alloy seat and disc and all other parts are renewable.

Size In.	Screwed No. 1690 Globe Each	Screwed No. 1691 Angle Each	Face to Face Globe In.	Cen. to Face Angle In.
¾	$6.30	$6.80	3⁹⁄₁₆	1⅝
1	8.00	8.60	4⅛	1¹⁵⁄₁₆
1¼	10.60	11.30	4¾	2¼
1½	14.00	15.00	5¼	2⁷⁄₁₆
2	20.40	21.80	6⅜	3

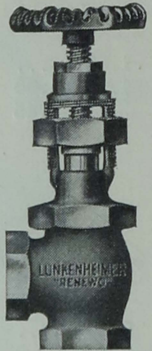
Lunkenheimer Renewo Plug Type Bronze Globe and Angle Valves

Renewable Nickel Alloy Seat and Disc
Screwed Yoke

300 Lbs. W.S.P., 550° F.
600 Lbs. G.L.P., 150° F.



No. 1690-P, Globe



No. 1691-P, Angle

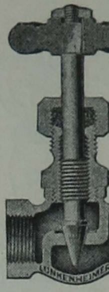
For throttling, drain and other service demanding maximum resistance to destructive action on valve seat bearings.

The seat and disc is of nickel alloy, a non-galling, nonferrous composition of great hardness (300 Brinell); resistant to wear, abrasion, erosion and corrosion, and retains its hardness at high temperature.

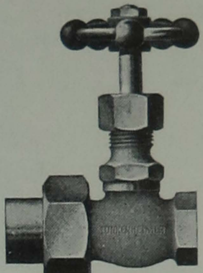
Size In.	Screwed No. 1690-P Globe Each	Screwed No. 1691-P Angle Each	Face to Face Globe In.	Cen. to Face Angle In.
¾	$7.50	$8.00	3⁹⁄₁₆	1⅝
1	9.50	10.10	4⅛	1¹⁵⁄₁₆
1¼	12.50	13.20	4¾	2¼
1½	16.50	17.50	5¼	2⁷⁄₁₆
2	23.50	25.00	6⅜	3

Lunkenheimer Bronze Needle Valves

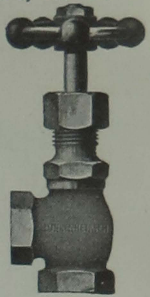
Bronze or Steel Stem
200 Lbs. W.S.P., 500° F.; 400 Lbs. G.L.P., 150° F.



No. 906, Globe



No. 909, Globe With Union



No. 907. Angle

The Lunkenheimer standard for the included angle of the tapered seating face at end of stem is 30°.

Valves with steel stem have smaller seat openings than valves with bronze stem and provide finer regulation. Diameters of seat openings are given below.

Bronze Stem, Rough Body

Size In.	Diam. Seat Openings Inches	Female Ends No. 906 Globe Each	Female Ends No. 907 Angle Each	Female Ends No. 908 Cross Each	Female Union on Outlet No. 909 Globe Each	Female Union on Outlet No. 910 Angle Each
⅛	⅛	$2.40	$2.50	$3.75	$3.50	$3.60
¼	³⁄₁₆	2.50	2.65	4.00	3.80	4.00
⅜	¼	2.80	3.00	5.00	4.50	4.75
½	⁵⁄₁₆	3.50	3.80	7.00	6.50	6.80

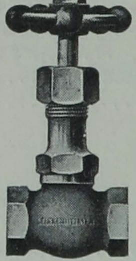
Steel Stem, Rough Body

Size In.	Diam. Seat Openings In.	Female Ends No. 906 Globe Each	Female Ends No. 907 Angle Each	Female Union on Outlet No. 909 Globe Each	Female Union on Outlet No. 910 Angle Each
⅛	³⁄₆₄	$2.60	$2.70	$4.00	$4.20
¼	¹⁄₁₆	2.75	2.90	4.30	4.50
⅜	³⁄₃₂	3.25	3.50	5.25	5.50
½	⅛	4.00	4.40	7.50	7.80

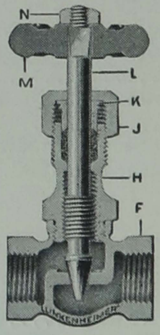
Lunkenheimer Bronze Needle Valves

With Gland
Bronze Stem Only

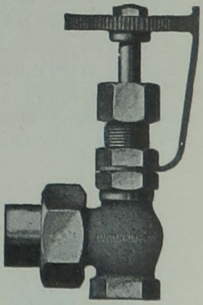
200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.



No. 1205 With Ball Wheel



Sectional View



No. 1568 With Indicator Wheel and Union

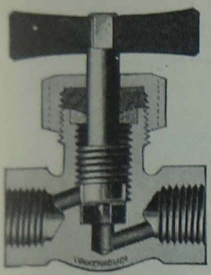
These valves are provided with gland follower in stuffing box and are furnished with bronze stem only.

The ¼, ⅜, ½ and ¾-inch sizes have been approved by the Underwriters' Laboratories for control of hazardous liquids. The Underwriters' Laboratories prescribe 50 pounds per square inch as the maximum pressure for hazardous liquid equipment.

Size Inches	Diam. of Seat Openings, In.	Price, Each: Ball Wheel Patterns, Female Ends No. 1205 Globe	Price, Each: Ball Wheel Patterns, Female Ends No. 1206 Angle	Price, Each: Indicator Wheel Patterns, With Union No. 1567 Globe	Price, Each: Indicator Wheel Patterns, With Union No. 1568 Angle
¼	³⁄₁₆	$3.00	$3.15	$7.00	$7.25
⅜	¼	3.30	3.50	8.00	8.30
½	⁵⁄₁₆	4.00	4.40	....	....
¾	⁷⁄₁₆	5.50	6.00	....	....
1	⁹⁄₁₆	9.00	9.50	....	....

No. 1204 Lunkenheimer Bronze Aqua-Air Needle Valves

250-Lb. G.L.P., 150° F.



For use on water and air lines in filling stations, garages, and industrial plants, also on water lines to rock drills of the type known as "water-liners," in which water flows through a hollow bit to saturate the pulverized drillings.

Resists corrosion. Seat is made of fiber and is renewable. Valve should be installed with pressure above seat, correct position indicated by an arrow cast on the body.

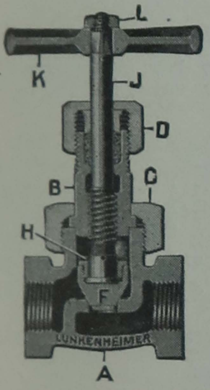
Size, 3/8 inch; face to face, 2 1/4 inches; center to top of stem, open, 2 9/16 inches; length of bar handle, 2 1/8 inches.

No. 1204 .... each **$4.00**

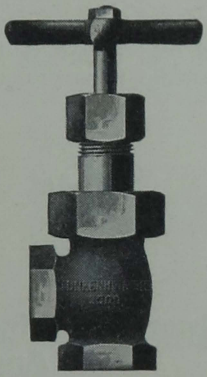
Lunkenheimer High Duty Bronze Regrinding Globe and Angle Valves

For Liquids, Air and Gases

Working Pressure, 2000 Lbs. G. L. P., 150° F.
Non-Shock Pressure, 4000 Lbs., G. L. P., 150° F.



No. 720, Globe



No. 721, Angle

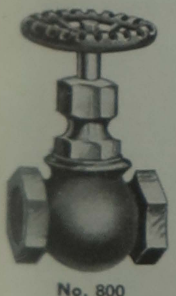
The seating surface is regrindable and all parts are renewable. Disc swivels on stem in all sizes. It is burnished over end of stem in 3/4-inch and smaller sizes, and retained by locknut in sizes 1 inch and larger. The stuffing box can be repacked when valve is under pressure and full open. Union connection between the body and bonnet strengthens the neck of the body and facilitates assembling and disassembling for regrinding or repairs.

Size Inches	Screwed, Each No. 720 Globe	 No. 721 Angle	Size Inches	Screwed, Each No. 720 Globe	 No 721 Angle
1/4	$7.60	$7.60	1	$19.50	$19.50
3/8	8.30	8.30	1 1/4	32.00	32.00
1/2	10.50	10.50	1 1/2	45.00	45.00
3/4	15.00	15.00	2	70.00	70.00

Brass Globe and Angle Valves

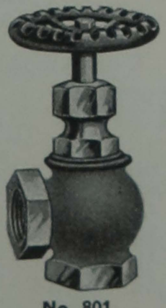
Screwed—Brass Disc

For 125 Pounds Steam Working Pressure



No. 800 Screwed

Size In.	Each
1/8	$ .72
1/4	.72
3/8	.77
1/2	1.00
3/4	1.26
1	1.80
1 1/4	2.52
1 1/2	3.50
2	5.30
2 1/2	10.00
3	14.40



No. 801 Angle

Walworth Bronze Globe, Angle and Cross Valves

Standard Pattern

With Red Enameled Non-Heating Hand Wheel

For 125 Pounds Steam Working Pressure
For 150 Pounds Non-Shock Working Oil, Water or Gas Pressures at Ordinary Air Temperatures

WALWORTH
125

No. 58, Globe Valve

WALWORTH
125

No. 59, Angle Valve

Can be repacked while under pressure if valve is wide open.

Size Inches	Each No. 58, Globe No. 59, Angle	 *No. 60 Cross	Size Inches	Each No. 58, Globe No. 59, Angle	 *No. 60 Cross
1/8	$.72	....	1 1/2	$3.50	$5.00
1/4	.72	$1.25	2	5.30	8.00
3/8	.77	1.25	2 1/2	10.00	16.00
1/2	1.00	1.50	3	14.40	24.00
3/4	1.26	2.00	3 1/2	26.50	.....
1	1.80	2.50	4	36.00	.....
1 1/4	2.52	3.50	...	.....	.....

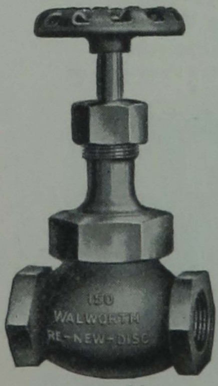
*Made to order only.

Flanged valves made to order only; prices on request.

Walworth Re-New-Disc Bronze Globe and Angle Valves

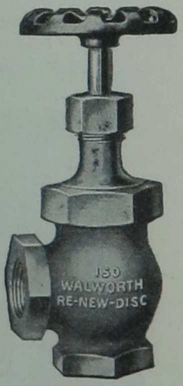
Renewable Asbestos Disc

For 150 Pounds Steam Working Pressure



No. 95, Globe

A disc holder, which slips on the stem, is accurately guided and held in place by lugs which fit snugly against inner walls of bonnet chamber, can be removed quickly and easily, and new asbestos disc inserted. Bronze stuffing box nut and bonnet ring give additional durability and permit unscrewing these parts any number of times without injury to the valve.



No. 96, Angle

The valve has gland in stuffing box and rugged body construction. For steam service it is furnished with hard asbestos discs. For cold water, gas, or air, soft composition may be used. Discs of steam metals are available.

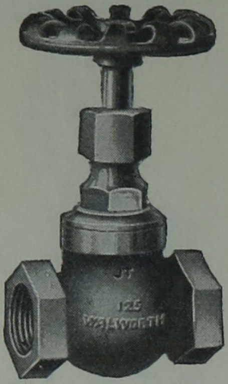
Size Inches	No. 95, Globe No. 96, Angle Screwed Each	Sc. End to End Globe Inches	Sc. Center to End Angle Inches
1/4	$1.10	2 1/16	15/16
3/8	1.25	2 5/16	1 1/16
1/2	1.60	2 11/16	1 1/4
3/4	2.20	3 3/16	1 7/16
1	2.80	3 3/4	1 3/4
1 1/4	4.00	4 1/4	2 1/16
1 1/2	5.50	4 3/4	2 1/4
2	8.75	5 7/8	2 3/4
2 1/2	15.75	6 3/4	3 1/4
3	22.00	8	3 13/16

Flanged valves are made to order only.

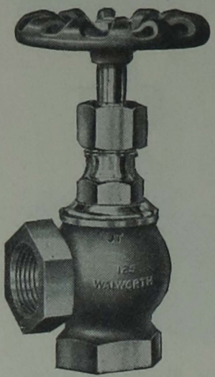
Walworth Special Jenkins Type Bronze Globe and Angle Valves

Renewable Composition Disc
Red Enameled Non-Heating Hand Wheel

For 125 Pounds Steam Working Pressure
For 175 Pounds Non-Shock Working Water Pressure, at Ordinary Air Temperatures



No. 280, Globe Valve



No. 281, Angle Valve

Can be repacked while under pressure when valve is wide open.

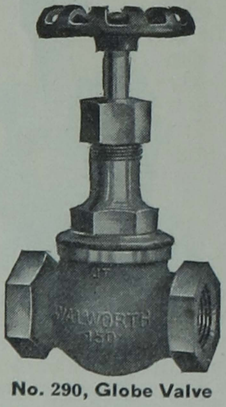
Unless otherwise specified, Walworth Jenkins Type Valves will be furnished with hard disc for steam. When wanted for cold water or air, such service should be specified and soft discs will be furnished at slight advance in price.

Size Inches	Each	Size Inches	Each	Size Inches	Each
¼	$1.10	1	$2.80	2½	$15.75
⅜	1.25	1¼	4.00	3	22.00
½	1.60	1½	5.50	...	.....
¾	2.20	2	8.75	...	.....

Walworth Jenkins Type Bronze Globe and Angle Valves

Heavy Pattern—Renewable Composition Disc Gland in Stuffing Box—Non-Heating Wheels

For 150 Pounds Working Steam Pressure
200 Pounds Non-Shock Working Water Pressure at Ordinary Air Temperatures



No. 290, Globe Valve

JT
WALWORTH
150

No. 291, Angle Valve

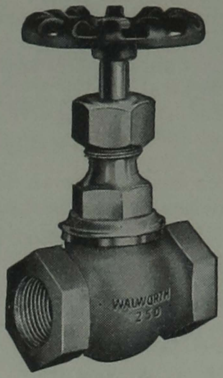
Can be repacked while under pressure when valve is wide open. Unless otherwise specified Walworth Jenkins Type Valve will be furnished with hard disc for steam. When wanted for cold water or air such service should be specified and soft discs will be furnished.

Size In.	End to End In.	Center to Inlet and Outlet, In.	Each	Size In.	End to End In.	Center to Inlet and Outlet, In.	Each
¼	2⅛	1 3/32	$1.10	1¼	4¼	2⅛	$4.00
⅜	2⅜	1 3/16	1.25	1½	4 13/16	2 13/32	5.50
½	2¾	1⅜	1.60	2	5¾	2⅞	8.75
¾	3¼	1⅝	2.20	2½	6¾	3¼	15.75
1	3 13/16	1⅞	2.80	3	7½	3¾	22.00

Walworth Extra Heavy Hard Bronze Globe and Angle Valves

With Ventilated Non-Heating Wheel

For 250 Pounds Steam Working Pressure (Saturated)
Tested to 800 Pounds Hydrostatic Pressure



No. 140, Globe
Screwed

WALWORTH
250

No. 141, Angle
Screwed

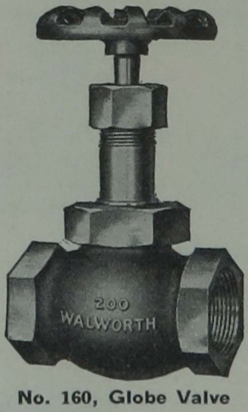
These valves have gland in stuffing box. They can be repacked while under pressure when the valve is wide open.

Size Inches	Screwed Each	Size Inches	Screwed Each
¼	$1.30	1¼	$5.00
⅜	1.50	1½	7.00
½	1.90	2	11.00
¾	2.50	2½	20.00
1	3.50	3	29.00

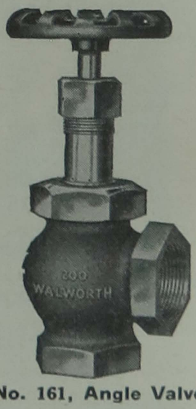
Walworth Regrinding Bronze Globe and Angle Valves

Greensburg Pattern
Screwed—Union Bonnet
With Red Enameled Non-Heating Hand Wheel

For 200 Pounds Working Steam Pressure
For 275 Pounds Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures



No. 160, Globe Valve



No. 161, Angle Valve

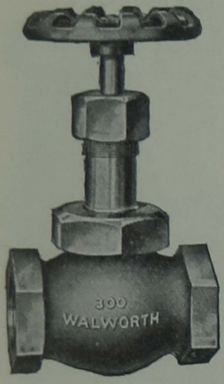
Can be repacked while under pressure when valve is wide open.

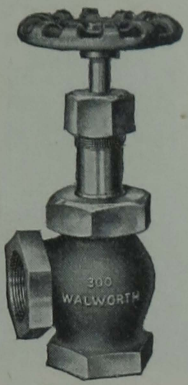
Size Inches	End to End Inches	Center to Inlet and Outlet Inches	Each	Size Inches	End to End Inches	Center to Inlet and Outlet Inches	Each
¼	2 1/16	1	$.70	1½	4 5/16	2⅛	$3.90
⅜	2⅛	1 1/16	.85	2	5¼	2 9/16	6.20
½	2 7/16	1 3/16	1.15	2½	6 7/16	3 5/16	12.00
¾	2 15/16	1⅜	1.45	3	7 3/16	3¾	16.50
1	3⅜	1⅝	2.00	3½	8	3 15/16	30.00
1¼	3⅞	1⅞	2.80	4	9	4⅝	40.00

Walworth Regrinding Bronze Globe and Angle Valves

Union Bonnet
With Red Enameled Non-Heating Hand Wheel

300 Pounds Working Steam Pressure
425 Pounds Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures


No. 205 Globe


No. 206 Angle

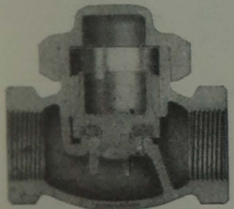
Can be repacked under pressure when wide open.

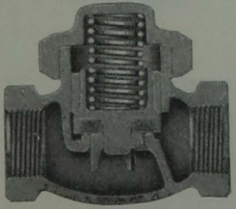
	No. 205 Globe		No. 206 Angle			No. 205 Globe		No. 206 Angle	
Size In.	End to End In.	Each	Center to Inlet and Outlet In.	Each	Size In.	End to End In.	Each	Center to Inlet and Outlet In.	Each
1/4	2 1/4	$.90	1	$.90	1 1/2	4 7/8	$7.10	2 3/8	$7.10
3/8	2 7/16	1.10	1 3/16	1.10	2	5 7/8	10.90	2 11/16	10.90
1/2	2 3/4	1.50	1 5/16	1.50	2 1/2	7 1/16	19.50	3 9/16	19.50
3/4	3 3/8	2.30	1 9/16	2.30	3	7 7/8	29.00	4	29.00
1	3 3/4	3.60	1 13/16	3.60	4	10 1/16	53.90	5 1/16	.....
1 1/4	4 5/16	5.10	2 1/8	5.10	...	....	.....	...	.....

Lunkenheimer Bronze N-M-D Lift Check Valves

Horizontal and Angle
Screwed Cap—Non-Metallic Disc

Screwed: 150 Lbs. W.S.P., 300 Lbs. G.L.P.
Flanged: 150 Lbs. W.S.P., 225 Lbs. G.L.P.


No. 231, Horizontal Without Spring


No. 233, Horizontal With Stainless Steel Spring

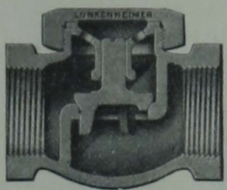
Orders should specify whether discs are for steam, hot water, cold water, gas or air.

	Screwed			Flanged				
Size Inches	No. 231 Horizontal Each	No. 272 Angle Each	No. 233 Horizontal Spring Loaded Each	No. 232 Horizontal Each	No. 273 Angle Each	Face to Face Inches	Center to Face Inches	Diam. Flanges Inches
1/8	$2.20	$2.20	$4.00	.....	.....	...	....	...
1/4	2.20	2.20	4.00	.....	.....	...	....	...
3/8	2.40	2.40	4.20	.....	.....	...	....	...
1/2	2.60	2.60	4.60	.....	.....	...	....	...
3/4	3.60	3.60	5.30	$10.40	$10.40	3 7/8	2 7/16	3 7/8
1	4.80	4.80	7.00	12.00	12.00	4 3/8	2 11/16	4 1/4
1 1/4	6.60	6.60	9.40	18.00	18.00	4 7/8	2 7/8	4 5/8
1 1/2	9.50	9.50	13.00	21.50	21.50	5 1/2	3 3/16	5
2	15.00	15.00	18.00	32.00	32.00	6 1/2	3 3/4	6

Lunkenheimer Bronze Regrinding Check Valves

Horizontal, Angle and Vertical
Screwed Cap

200 Lbs. W.S.P., 500° F.
400 Lbs. G.L.P., 150° F.


No. 414, Horizontal

No. 415, Angle

Seating surfaces are regrindable; all parts are renewable; areas throughout the body are in excess of that of the connecting pipe; the disc is well guided at both the top and bottom, insuring perfect seating.

On the 2½-inch and larger sizes, a round slotted cap is provided instead of the hexagon cap shown.

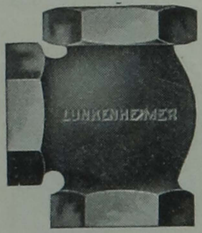
	Screwed		
Size Inches	No. 414 Horizontal Each	No. 415 Angle Each	No. 418 Vertical Each
1/8	$.50	$.50	$.50
1/4	.50	.50	.50
3/8	.60	.60	.60
1/2	.85	.85	.85
3/4	1.15	1.15	1.15
1	1.55	1.55	1.55
1 1/4	2.30	2.30	2.30
1 1/2	3.25	3.25	3.25
2	5.20	5.20	5.20
2 1/2	10.00	10.00	10.00
3	14.00	14.00	14.00

Lunkenheimer Bronze Regrinding Check Valves

Horizontal, Angle and Vertical
Screwed Cap

300 Lbs. W. S. P., 550° F.
600 Lbs. G. L. P., 150° F.

No. 413, Horizontal


No. 621, Angle

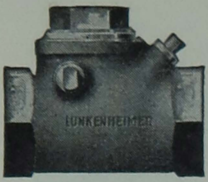
Seating surfaces are regrindable; all parts are renewable; areas throughout the body are in excess of that of the connecting pipe; the disc is well guided at both the top and bottom, insuring perfect seating.

On the 2½-inch and larger sizes, a round slotted cap is provided instead of the hexagon cap shown.

	Screwed, Price, Each		
Size Inches	No. 413 Horizontal	No. 621 Angle	No. 622 Vertical
1/4	$.90	$.90	$.90
3/8	1.00	1.00	1.00
1/2	1.20	1.20	1.20
3/4	1.70	1.70	1.70
1	2.80	2.80	2.80
1 1/4	3.90	3.90	3.90
1 1/2	5.50	5.50	5.50
2	8.90	8.90	8.90
2 1/2	16.20	16.20	16.20
3	24.30	24.30	24.30

No. 554 Lunkenheimer Bronze Regrinding Swing Check Valves

Screwed Cap
200 Lb. W. S. P., 500° F.
400 Lb. G. L. P., 150° F.

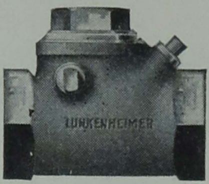


The seating surfaces are regrindable and all parts are renewable. Two side plugs are provided which act as bearings for the disc carrier pin and these being also renewable, the perfect seating of the disc can at all times be maintained. The valves may be connected in either a horizontal or vertical position.

Size Inches	Screwed Price, Ea.	Size Inches	Screwed Price, Ea.	Size Inches	Screwed Price, Ea.
¼	$1.25	1	$2.25	2½	$11.50
⅜	1.25	1¼	3.25	3	16.00
½	1.30	1½	4.25	...	.....
¾	1.75	2	6.25	...	.....

No. 624 Lunkenheimer Bronze Regrinding Swing Check Valves

Screwed Cap
300 Lb. W. S. P., 550° F.
600 Lb. G. L. P., 150° F.



The seating surfaces are regrindable and all parts are renewable.

Two side plugs are provided which act as bearings for the disc carrier pin and these being also renewable, the perfect seating of the disc can at all times be maintained.

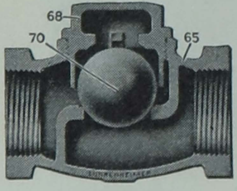
The valves may be connected in either a horizontal or vertical position.

Size Inches	Screwed Price, Ea.	Size Inches	Screwed Price, Ea.	Size Inches	Screwed Price, Ea.
¼	$2.00	1	$4.00	2½	$18.30
⅜	2.10	1¼	5.60	3	28.30
½	2.20	1½	7.50	...	.....
¾	2.90	2	11.00	...	.....

Lunkenheimer Bronze Ball Check Valves

Horizontal, Angle and Vertical
Screwed Cap

200 lb. W. S. P., 500° F.
400 lb. G. L. P., 150° F.



No. 416
Horizontal

LUNKENHEIMER

No. 739
Angle

LUNKENHEIMER

No. 740
Vertical

This valve embodies features essential to successful operation under service conditions for which the ball type of check valve is suitable.

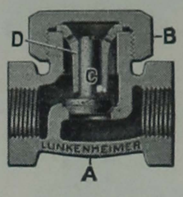
The non-ferrous metal ball is manufactured under the most modern method, is specially gaged, and the guide is designed to minimize wear.

Size Inches	No. 416, Horizontal Each	No. 416, Horizontal Face to Face, In.	No. 739, Angle Each	No. 739, Angle Center to Face, In.	No. 740, Vertical Each	No. 740, Vertical Face to Face, In.
⅛	$.85	1 9/16	$.85	¾	$.85	1½
¼	.95	1⅝	.95	13/16	.95	1 15/16
⅜	1.10	2¼	1.10	1	1.10	2 3/16
½	1.60	2⅝	1.60	1 3/16	1.60	2 7/16
¾	2.30	3 3/16	2.30	1⅜	2.30	2 13/16
1	3.50	3¾	3.50	1 11/16	3.50	3 5/16
1¼	5.30	4 5/16	5.30	1 15/16	5.30	3 13/16
1½	7.50	4 13/16	7.50	2 3/16	7.50	4⅛
2	11.50	5 15/16	11.50	2 11/16	11.50	5
2½	18.00	7 1/16	18.00	3 3/16	18.00	6 1/16
3	27.00	7⅞	27.00	3⅝	27.00	6 9/16

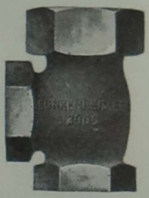
Lunkenheimer High Duty Bronze Regrinding Check Valves

For Liquids, Air and Gases

Working Pressure, 2000 Lbs. G.L.P., 150° F.
Non-Shock Pressure, 4000 Lbs. G.L.P., 150° F.



No. 815, Horizontal



No. 816, Angle

The unusually severe nature of the requirements of the various services for which high duty valves may be applied, is indicative of the quality of material and method of manufacture used in their construction.

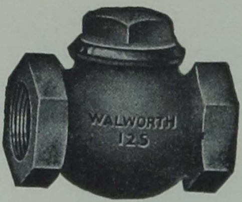
Structurally, each size is correct and each part is proportioned to provide a proper factor of safety even at the maximum non-shock pressure limit.

The disc is well guided and perfect seating is insured. Seating surface is regrindable and all parts renewable.

Size Inches	Screwed, Each No. 815 Horizontal	Screwed, Each No. 816 Angle	Size Inches	Screwed, Each No. 815 Horizontal	Screwed, Each No. 816 Angle
¼	$4.10	$4.10	1	$11.00	$11.00
⅜	4.60	4.60	1¼	17.50	17.50
½	5.50	5.50	1½	23.50	23.50
¾	8.60	8.60	2	38.00	38.00

Walworth Standard Bronze Check Valves

For 125 Pounds Steam Working Pressures



No. 73 Globe

Size In.	Screwed Each	Size In.	Screwed Each
⅛	$.65	1½	$3.15
¼	.65	2	4.75
⅜	.70	2½	9.00
½	.90	3	13.00
¾	1.15	3½	24.00
1	1.60	4	32.50
1¼	2.25	...	.....

WALWORTH
125

No. 75 Vertical

Size Inches	Screwed Each	Size Inches	Screwed Each
¼	$.72	1¼	$2.52
⅜	.77	1½	3.50
½	1.00	2	5.30
¾	1.26	2½	10.00
1	1.80	3	14.40

WALWORTH
125

No. 74 Angle

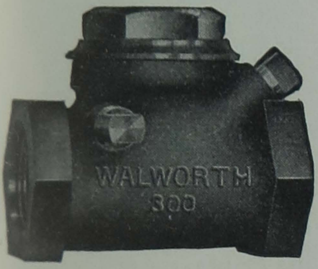
Size Inches	Screwed Each	Size Inches	Screwed Each
¼	$.72	1¼	$2.52
⅜	.77	1½	3.50
½	1.00	2	5.30
¾	1.26	2½	10.00
1	1.80	3	14.40

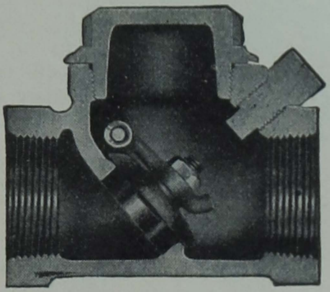
Flanged check valves, prices on application.

No. 428 Walworth Extra Heavy Regrinding Bronze Swing Check Valves

For Horizontal or Vertical Flow

Working Steam Pressure:
½ to 2 Inches, Screwed, 300 Pounds
2½ to 3 Inches, Screwed, 250 Pounds
1 to 2½ Inches, Flanged, 250 Pounds
Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures:
½ to 2 Inches, Screwed, 425 Pounds
2½ to 3 Inches, Screwed, 400 Pounds
1 to 2½ Inches, Flanged, 375 Pounds





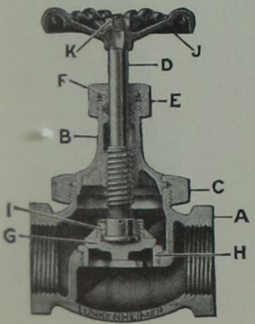
Size In.	No. 428 Screwed Each	No. 428 Screwed End to End, In.	No. 428F Flanged Each	No. 428F Flanged Face to Face, In.	No. 428F Flanged Diam. Flg., In.
½	$2.70	2½	.....	...	...
¾	3.25	3¹⁄₁₆	.....	...	...
1	4.25	3⅝	$13.00	7	4⅞
1¼	6.00	4⅛	18.00	8½	5¼
1½	7.50	4⅝	22.00	8½	6⅛
2	12.00	5¼	37.50	9	6½
2½	25.00	6¼	55.00	10¼	7½
3	45.00	7¹⁄₁₆	.....	....	...

Flanged valves made to order only.

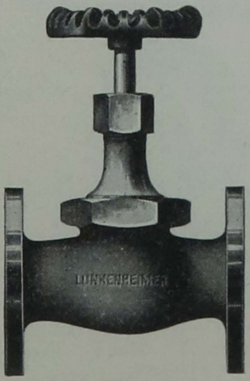
Lunkenheimer SA Globe Valves

For Corrosive Service

Union Bonnet



No. 1398, Screwed



No. 1399, Flanged

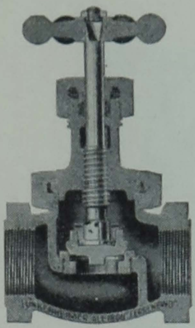
For use primarily in handling sulphuric acid, alkalis, and other corrosive fluids in the manufacture of sugar, paper, rubber, caustics, fertilizers, coke and by-products, in oil refineries, water softening processes, etc.

Size In.	Screwed		Flanged		
	No. 1398 Each	Face to Face In.	No. 1399 Each	Face to Face In.	Diam. Flanges In.
½	$22.00	2⅝	......	...	...
¾	24.00	3¼	......	...	...
1	28.00	3¾	......	...	...
1¼	38.00	4¼	......	...	...
1½	45.00	4¾	$75.00	6⅛	5
2	65.00	5¾	95.00	7¼	6
2½	.....	...	125.00	8	7
3	.....	...	150.00	9	7½

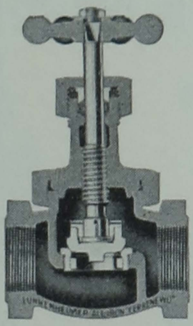
Lunkenheimer Ferrenewo All Iron Globe and Angle Valves

Union Bonnet, Screwed Ends

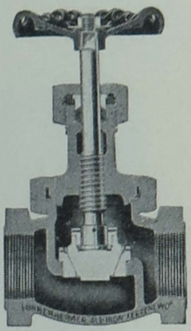
150 Lbs. W.S.P., 450° F.
225 Lbs. G.L.P., 150° F.



No. 1113 Globe
No. 1114, Angle
Iron Seat & Disc



No. 1857 Globe
No. 1858 Angle
Full-Way Nickel Alloy Seat & Disc



No. 1857-P Globe
No. 1858-P Angle
Plug Type Nickel Alloy Seat & Disc

Nos. 1113 and 1114, with iron seat and disc and steel stem, for fluids which attack brass, bronze and nickel alloys, but not iron or steel. Nos. 1857, 1858, 1857-P and 1858-P, with iron body and bonnet and nickel alloy seat, disc, locknut, gland and stem, for water, steam, gas, oil, etc.

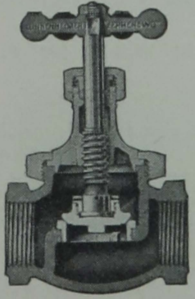
Size In.	No. 1113 Globe No. 1114 Angle Each	No. 1857 Globe No. 1858 Angle Each	No. 1857-P Globe No. 1858-P Angle Each	Face to Face Globe In.	Center to Face Angle In.	Center to Top of Stem Open In.	Diam. Hand-wheel In.	Wt. Lbs.
¼	$1.60	$1.00	$1.45	2⁹⁄₁₆	1³⁄₁₆	4⅜	2	1.4
⅜	1.70	1.00	1.45	2¹¹⁄₁₆	1⁵⁄₁₆	4⅜	2	1.5
½	1.90	1.25	1.70	3	1⁷⁄₁₆	4¹¹⁄₁₆	2⁷⁄₁₆	2.1
¾	2.10	1.75	2.30	3⁹⁄₁₆	1⅝	6	2¹⁵⁄₁₆	3.4
1	2.50	2.20	2.85	4⅛	1¹⁵⁄₁₆	6⅝	3⅜	4.9
1¼	3.30	3.15	4.00	4¾	2¼	7⁵⁄₁₆	3¹³⁄₁₆	6.8
1½	4.40	4.35	5.70	5¼	2⁷⁄₁₆	7⅞	4	9.3
2	6.30	6.30	7.80	6¼	3	8¹⁵⁄₁₆	4¾	14.8

Lunkenheimer Ferrenewo Iron Body Globe, Angle and Cross Valves

Renewable Nickel Alloy Seat and Disc

Union Bonnet

150 Lbs. W.S.P., 450° F.
225 Lbs. G.L.P., 150° F.



No. 1021, Globe

LUNKENHEIMER
FERRENEWO

No. 1022, Angle

Seating surfaces are regrindable; all parts, including nickel alloy seat and disc, are renewable.

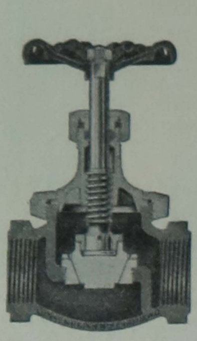
Valves 2-inch and smaller are union bonnet, inside screw type; 2½, 3 and 4-inch are outside screw and yoke type.

Size Inches	Screwed			Face to Face Inches	Center to Face Inches
	No. 1021 Globe Each	No. 1022 Angle Each	No. 1023 Cross Each		
¼	$1.10	$1.10	$1.70	2⁹⁄₁₆	1³⁄₁₆
⅜	1.25	1.25	2.00	2¹¹⁄₁₆	1⁵⁄₁₆
½	1.60	1.60	2.25	3	1⁷⁄₁₆
¾	2.20	2.20	2.50	3⁹⁄₁₆	1⅝
1	2.80	2.80	3.25	4⅛	1¹⁵⁄₁₆
1¼	4.00	4.00	4.75	4¾	2¼
1½	5.50	5.50	6.25	5¼	2⁷⁄₁₆
2	8.75	8.75	9.50	6¼	3
2½	17.00	17.00	....	7⅜	3¹¹⁄₁₆
3	22.00	22.00	....	8⅜	4³⁄₁₆
4	40.00	40.00	....	10	5

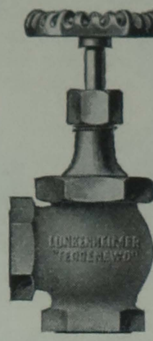
Lunkenheimer Ferrenewo Plug Type Iron Body Globe and Angle Valves

Renewable Nickel Alloy Seat and Disc
Union Bonnet

150 Lbs. W.S.P., 450° F.
225 Lbs. G.L.P., 150° F.



No. 1021-P, Globe



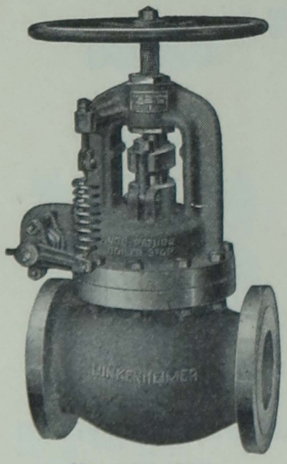
No. 1022-P, Angle

For throttling, drain and other service demanding maximum resistance to destructive action on valve seat bearings.

The seat and disc nickel alloy is a non-galling, non-ferrous composition of great hardness (300 Brinell); resistant to wear, abrasion, erosion and corrosion, and retains its hardness at high temperature.

Size Inches	No. 1021-P Globe Each	No. 1022-P Angle Each	Face to Face Inches	Center to Face Inches
¼	$2.50	$2.50	2 9/16	1 3/16
⅜	2.50	2.50	2 11/16	1 5/16
½	3.00	3.00	3	1 7/16
¾	4.00	4.00	3 9/16	1⅝
1	5.00	5.00	4⅛	1 15/16
1¼	7.00	7.00	4¾	2¼
1½	10.00	10.00	5¼	2 7/16
2	14.50	14.50	6¼	3

Lunkenheimer Iron Body Safety Non-Return Valves



No. 1407, Globe

Bronze Mounted
Outside Screw
Flanged Yoke Bonnet

250 Lbs. W.S.P., 450° F.

These valves automatically close and instantly cut out a boiler connected in battery when the pressure within the boiler suddenly drops below that of the header.

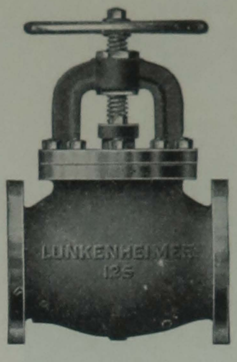
They may be installed with the valve stem in either a vertical or horizontal plane.

The seating surfaces are regrindable and all parts, including the seat and disc, are renewable.

Size In.	Face to Face Inches Scrd.	Face to Face Inches Flgd.	Center to Face Inches Scrd.	Center to Face Inches Flgd.	Diam. Flanges In.	Price, Each No. 1441 Globe No. 1442 Angle Screwed	Price, Each No. 1407 Globe No. 1408 Angle Flanged
3	11¾	12½	5⅞	6¼	8¼	$65.00	$68.00
3½	12¾	13½	6⅜	6¾	9	78.00	81.00
4	13	14	6½	7	10	86.00	90.00
4½	....	15	...	7½	10½	.....	100.00
5	....	15¾	...	7⅞	11	.....	115.00
6	....	17½	...	8¾	12½	.....	135.00
7	....	19¼	...	9⅝	14	.....	180.00
8	....	21¾	...	10½	15	.....	230.00
10	....	25⅜	...	12¼	17½	.....	400.00

Lunkenheimer Iron Body Globe, Angle and Cross Valves

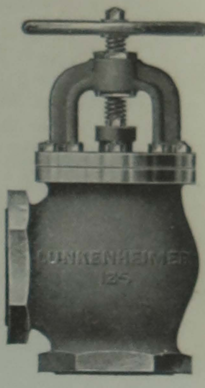
Bronze Mounted, Outside Screw, Flanged Yoke Bonnet



125 Lbs. W.S.P., 450° F.

175 Lbs. G.L.P., 150° F.

Seating surfaces are regrindable; seat, disc and all other parts are renewable; stuffing box can be repacked when valves are under pressure and full open.



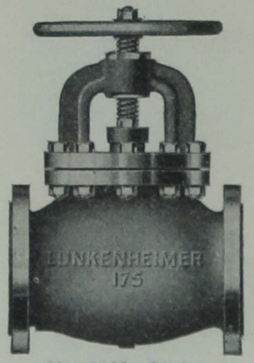
No. 1123 Globe Flanged

No. 1121 Angle Screwed

Size In.	Screwed 1120 Globe 1121 Angle Each	Screwed 1122 Cross Each	Screwed Face to Face In.	Screwed Center to Face In.	Flanged 1123 Globe 1124 Angle Each	Flanged 1125 Cross Each	Flanged Face to Face In.	Flanged Center to Face In.	Flanged Diam. Flgs. In.
2	$11.50	$14.00	6⅜	3 3/16	$13.00	$17.50	7¾	3⅞	6
2½	15.00	18.50	7⅜	3 11/16	17.00	21.50	8¾	4⅜	7
3	18.50	23.50	8⅜	4 3/16	21.00	27.50	9½	4¾	7½
3½	24.50	31.00	9	4½	28.00	36.00	10½	5½	8½
4	31.00	38.00	10	5	35.00	44.00	11⅜	5 11/16	9
4½	38.00	48.00	11⅛	5 9/16	43.00	55.00	12⅛	6 1/16	9¼
5	46.00	58.00	12	6	51.00	66.00	12¾	6⅜	10
6	61.00	77.00	13⅞	6 15/16	66.00	86.00	14⅜	7 3/16	11
7	.....	.....	....	...	96.00	120.00	16⅛	8 1/16	12½
8	.....	.....	....	...	130.00	155.00	19¼	8¾	13½
10	.....	.....	....	...	190.00	225.00	24¼	10⅛	16
12	.....	.....	....	...	280.00	330.00	27½	12	19

Lunkenheimer Iron Body Globe, Angle and Cross Valves

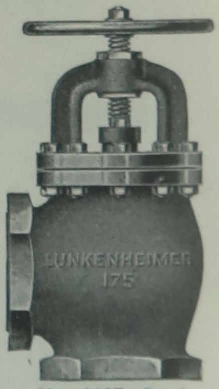
Bronze Mounted, Outside Screw, Flanged Yoke Bonnet



No. 1129, Globe Flanged

175 Pounds, W.S.P., 450° F.

250 Pounds, G.L.P., 150° F.



No. 1127, Angle Screwed

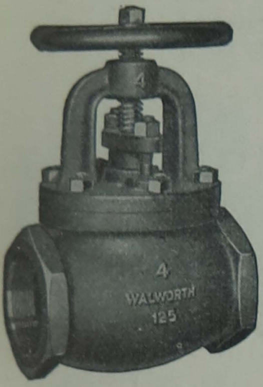
Seating surfaces are regrindable; the seat, disc and all other parts are renewable; the stuffing box can be repacked when valves are under pressure and full open.

Size In.	Screwed No. 1126 Globe No. 1127 Angle Each	Screwed No. 1128 Cross Each	Screwed Face to Face In.	Screwed Center to Face In.	Flanged No. 1129 Globe No. 1130 Angle Each	Flanged No. 1131 Cross Each	Flanged Face to Face In.	Flanged Center to Face In.	Flanged Diam. Flanges In.
2	$14.00	$18.00	7 9/16	3 13/16	$16.00	$23.00	9¾	4⅞	6½
2½	18.00	23.50	9	4½	20.50	29.50	11	5½	7½
3	23.00	32.00	10 7/16	5¼	26.00	39.00	12¼	6⅛	8¼
3½	30.00	40.00	11¾	5⅞	34.00	50.00	13	6½	9
4	38.00	47.00	12⅝	6 5/16	42.00	58.00	13⅝	6 13/16	10
4½	46.00	.....	13⅝	6 13/16	52.00	.....	14½	7¼	10½
5	57.00	75.00	14½	7¼	64.00	90.00	15¾	7⅞	11
6	74.00	100.00	16¼	8⅛	81.00	115.00	17½	8¾	12½
7	.....	.....	....	...	115.00	155.00	19¼	9⅝	14
8	.....	.....	....	...	155.00	205.00	21¾	10½	15

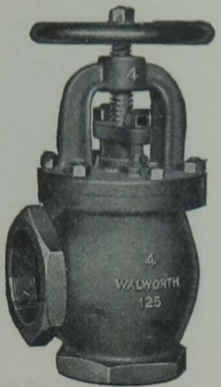
Walworth Iron Body Globe and Angle Valves

Yoke Top, Bronze Mounted

For 125 Pounds Working Steam Pressure

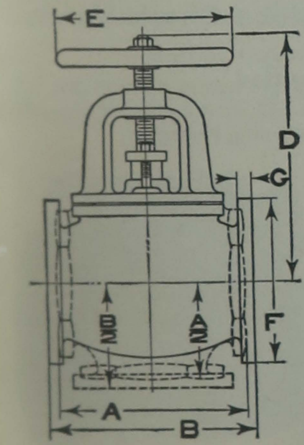


No. 906, Globe. Screwed



No. 907, Angle, Screwed

Size Inches	Each: No. 906 Globe No. 907 Angle Screwed	Each: No. 906F Globe No. 907F Angle Flanged	Face to Face Inches Scrd.	Face to Face Inches Flgd.	Center to Face Inches Scrd.	Center to Face Inches Flgd.	Diam. Flgs. In.
2	$7.00	$8.60	6½	8	3¼	4	6
2½	9.00	10.75	7	8½	3½	4¼	7
3	12.50	15.00	8	9½	4	4¾	7½
3½	15.25	18.50	9	10½	4½	5¼	8½
4	19.00	22.50	10	11½	5	5¾	9
5	27.00	31.00	11¼	13	5⅝	6½	10
6	37.50	42.00	13	14	6½	7	11
8	72.00	77.00	16	17	8	8½	13½
10	114.00	123.00	19¼	20	9⅝	10	16
12	170.00	187.00	22¼	24	11⅛	12	19
14	......	350.00	....	28	....	14	21
16	......	475.00	....	32	....	16	23½



General Dimensions of Walworth Standard Iron Body Globe, Angle and Cross Valves

Nos. 906, 907, 908, 906F, 907F, 908F

Yoke Top—Bronze Mounted

Working Steam Pressure, 125 Lbs. for Sizes 12-Inch and Smaller; 100 Lbs. for 14 and 16-Inch Sizes

Size In.	Screwed: A End to End Globe In.	Screwed: A/2 Cen. to Inlet and Outlet Angle and Cross In.	Flanged: B Face to Face Globe In.	Flanged: B/2 Cen. to Face Inlet & Outlet Angle & Cross In.	Flanged: F Diam. Flgs. In.	Flanged: G Thick. Flgs. In.	D Center to Top of Stem Closed In.	D Center to Top of Stem Open In.	E Diam. Hand Wheel In.	No. of Turn to Open
2	6½	3¼	8	4	6	⅝	9¼	10⅛	6	5¼
2½	7	3½	8½	4¼	7	¹¹⁄₁₆	9⅞	11	6	6⅜
3	8	4	9½	4¾	7½	¾	11⅛	12¼	8	4½
3½	9	4½	10½	5¼	8½	¹³⁄₁₆	11¾	13	8	5
4	10	5	11½	5¾	9	¹⁵⁄₁₆	12⅞	14¼	9	5½
5	11¼	5⅝	13	6½	10	¹⁵⁄₁₆	14½	16¼	10	7
6	13	6½	14	7	11	1	16⅛	18	12	7½
8	16	8	17	8½	13½	1⅛	22¾	25½	18	11½
10	19¼	9⅝	20	10	16	1³⁄₁₆	26¼	30	18	14⅜
12	22¼	11⅛	24	12	19	1¼	29¾	34	20	17
14	....	....	28	14	21	1⅜	30¾	35	24	17
16	....	....	32	16	23½	1⁷⁄₁₆	34	39	27	20

Lunkenheimer Iron Body Check Valves

Bronze Mounted Horizontal and Angle Flanged Cap

**125 Lbs. W.S.P., 450° F.
175 Lbs. G.L.P., 150° F.**

LUNKENHEIMER
125

No. 1136, Horizontal Screwed

LUNKENHEIMER
125

No. 1137, Angle Screwed

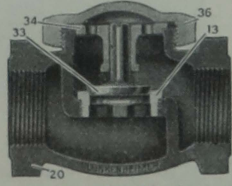
Seating surfaces are regrindable; all parts, including the bronze seat ring, are renewable; areas throughout the body are in excess of that of the connecting pipe; the disc is well guided and perfect seating is assured.

Size In.	Face to Face Inches Scrd.	Face to Face Inches Flgd.	Center to Face Inches Scrd.	Center to Face Inches Flgd.	Diam. Flanges In.	Price, Each: No. 1136 Hor. No. 1137 Angle Screwed	Price, Each: No. 1138 Hor. No. 1139 Angle Flanged
2	6⅜	7¾	3³⁄₁₆	3⅞	6	$9.00	$10.50
2½	7⅜	8¾	3¹¹⁄₁₆	4⅜	7	12.00	14.00
3	8⅜	9½	4³⁄₁₆	4¾	7½	14.50	17.00
3½	9	10½	4½	5½	8½	20.50	24.00
4	10	11⅜	5	5¹¹⁄₁₆	9	26.00	30.00
4½	11⅛	12⅛	5⁹⁄₁₆	6¹⁄₁₆	9¼	33.00	38.00
5	12	12¾	6	6⅜	10	39.00	44.00
6	13⅞	14⅜	6¹⁵⁄₁₆	7³⁄₁₆	11	54.00	59.00
7	....	16⅛	...	8¹⁄₁₆	12½	.....	89.00
8	....	19¼	...	8¾	13½	.....	120.00

Lunkenheimer Ferrenewo Iron Body Check Valves

Horizontal and Angle Screwed Cap

**Renewable Nickel Alloy Seat and Disc
150 Lbs. W.S.P., 450° F.
225 Lbs. G.L.P., 150° F.**



No. 898, Horizontal

LUNKENHEIMER
"FERRENEWO"

No. 899, Angle

The body is of iron, the seat and disc are nickel alloy highly resistive to wear and corrosion, and the disc guide and cap are of bronze.

Seating surfaces are regrindable; the nickel alloy seat and disc together with all other parts are renewable; areas throughout the body are in excess of that of the connecting pipe; the disc is well guided, insuring perfect seating.

Sizes ¼ to 1½ inches inclusive have hexagonal caps. The 2-inch size is furnished with a round slotted cap.

Size Inches	Screwed, Each: No. 898 Horizontal	Screwed, Each: No. 899 Angle	Face to Face Inches	Center to Face Inches
¼	$1.10	$1.10	2⁹⁄₁₆	1³⁄₁₆
⅜	1.20	1.20	2¹¹⁄₁₆	1⁵⁄₁₆
½	1.30	1.30	3	1⁷⁄₁₆
¾	1.90	1.90	3⁹⁄₁₆	1⅝
1	2.60	2.60	4⅛	1¹⁵⁄₁₆
1¼	3.80	3.80	4¾	2¼
1½	5.00	5.00	5¼	2⁷⁄₁₆
2	8.30	8.30	6¼	3

Lunkenheimer Iron Body Check Valves

Bronze Mounted
Horizontal and Angle
Flanged Cap

250 Lbs. W.S.P., 450° F.
400 Lbs. G.L.P., 150° F.

LUNKENHEIMER
250

No. 900, Horizontal Screwed

LUNKENHEIMER
250

No. 901, Angle Screwed

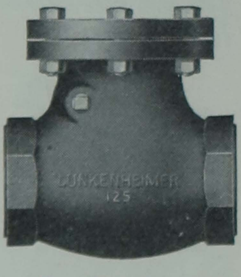
Seating surfaces are regrindable; all parts, including the bronze seat ring, are renewable; areas throughout the body are in excess of that of the connecting pipe; the disc is well guided and perfect seating is assured.

Size In.	Face to Face Inches Scrd.	Face to Face Inches Flgd.	Center to Face Inches Scrd.	Center to Face Inches Flgd.	Diam. Flanges In.	Price, Each No. 900 Hor. No. 901 Angle Screwed	Price, Each No. 902 Hor. No. 903 Angle Flanged
2	8 3/16	9¾	4⅛	4⅞	6½	$23.00	$25.00
2½	10⅝	11½	5⅜	5¾	7½	26.50	28.00
3	11¾	12½	5⅞	6¼	8¼	29.50	32.00
3½	12¾	13½	6⅜	6¾	9	34.00	36.00
4	13	14	6½	7	10	42.00	45.00
4½	....	15	...	7½	10½	.....	50.00
5	....	15¾	...	7⅞	11	.....	60.00
6	....	17½	...	8¾	12½	.....	75.00
7	....	19¼	...	9⅝	14	.....	100.00
8	....	21¾	...	10½	15	.....	130.00

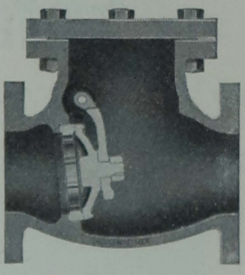
Lunkenheimer Iron Body Swing Check Valves

Bronze Mounted

125 Lbs. W.S.P., 450° F.
175 Lbs. G.L.P., 150° F.



No. 1789, Screwed



No. 1790, Flanged

Seating surfaces are regrindable and all parts, including the bronze seat and disc are renewable.

Two side plugs are provided which act as bearings for the disc carrier and these also being renewable, the perfect seating of the disc can at all times be maintained.

The valves may be connected in either a horizontal or vertical position. Having a practically straightway flow channel, and the area throughout the body being in excess of that of the connecting pipe, an unobstructed flow is assured.

Size Inches	No. 1789, Screwed Each	No. 1789, Screwed Face to Face Inches	No. 1790, Flanged Each	No. 1790, Flanged Face to Face Inches	No. 1790, Flanged Diameter Flanges Inches
2	$15.00	8	$18.00	8	6
2½	17.00	8½	20.00	8½	7
3	19.00	9½	24.00	9½	7½
3½	24.00	10½	29.00	10½	8½
4	28.00	11½	33.00	11½	9
5	42.00	13	47.00	13	10
6	50.00	14	57.00	14	11
8	.....	....	105.00	19½	13½
10	.....	....	160.00	24½	16

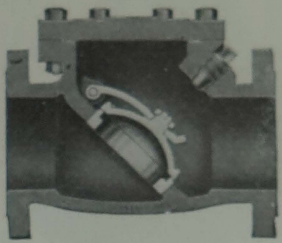
Lunkenheimer Iron Body Swing Check Valves

Bronze Mounted, Flanged Cap

250 Lbs. W.S.P., 450° F.
400 Lbs. G.L.P., 150° F.

LUNKENHEIMER
250

No. 324, Screwed



No. 323, Flanged

Seating surfaces are regrindable and all parts, including the bronze seat ring, are renewable.

Two side plugs are provided which act as bearings for the disc carrier pin and these also being renewable, the perfect seating of the disc can at all times be maintained.

Size Inches	Face to Face Inches Screwed	Face to Face Inches Flanged	Diameter Flanges Inches	Price, Each No. 324 Screwed	Price, Each No 323 Flanged
2	7	10 1/16	6½	$26.00	$28.00
2½	7⅞	11 7/16	7½	30.00	32.00
3	8⅞	12 7/16	8¼	33.00	36.00
3½	9⅝	13⅜	9	39.00	41.00
4	10⅝	14¾	10	42.00	45.00
4½	....	15 9/16	10½	.....	52.00
5	....	16⅜	11	.....	60.00
6	....	18	12½	.....	72.00
7	....	20	14	.....	95.00
8	....	21¾	15	.....	115.00

Walworth Iron Body Globe Check Valves

Bronze Mounted

For 125 Pounds Steam Working Pressure

4
WALWORTH
125

No. 920, Screwed

4
WALWORTH
125

No. 920F, Flanged

Size In.	Screwed No. 920 Each	Screwed Face to Face In.	Flanged No. 920F Each	Flanged Face to Face In.	Flanged Diam. Flanges In.
*2	$3.60	6½	$6.00	8	6
*2½	6.50	7	8.25	8½	7
*3	8.90	8	11.50	9½	7½
3½	12.25	9	15.50	10½	8½
4	14.25	10	18.00	11½	9
5	22.00	11¼	26.00	13	10
6	30.00	13	35.00	14	11
8	.....	....	62.00	17	13½

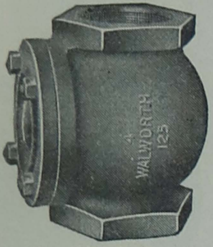
For larger sizes swing check valves are recommended.

*No. 920 sizes 3 inches and smaller furnished with bronze screwed cap. Larger sizes have bolted cover.

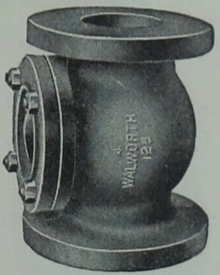
Walworth Iron Body Vertical Check Valves

Bronze Mounted

Working Steam Pressure, 125 Pounds



No. 924, Screwed



No. 924F, Flanged

Size In.	No. 924 Screwed Each	End to End Inches	No. 924F Flanged Each	Face to Face Inches	Diam. Flanges Inches
2	$7.00	5½	$8.75	8	6
2½	9.50	6⅝	11.50	6¾	7
3	12.50	7½	15.00	8¼	7½
3½	17.00	8¼	20.00	8⅝	8½
4	21.00	9	25.00	10⅛	9
5	33.00	11	37.00	11⅝	10
6	40.00	12½	45.00	13	11
8	73.00	16¼	78.00	17	13½
10	125.00	20½	135.00	20	16

All sizes, both screwed and flanged, have cast iron covers on sides.

Flanged valves will be shipped faced only, unless otherwise specified.

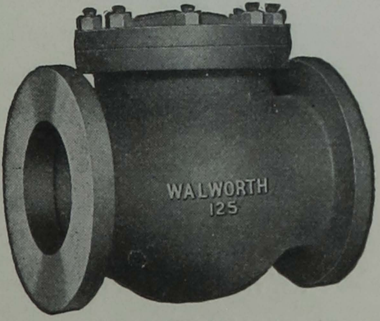
Walworth Iron Body Swing Check Valves

Bolted Cover, Bronze Mounted

For 125 Pounds Steam Working Pressure 12 Inches and Smaller
For 100 Pounds Steam Working Pressure 14 Inches and Larger

WALWORTH
125

No. 928, Screwed



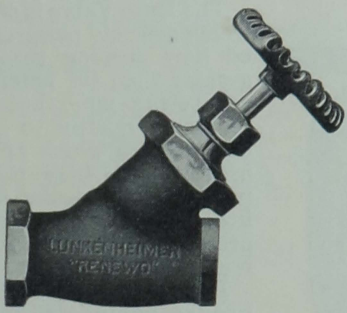
No. 928F, Flanged

Size In.	Each With Bronze Faced Disc No. 928 Screwed	 No. 928F Flanged	 Add for Leather Disc	 No. 934 Hub End with Leather Disc	Face to Face Inches Scrd.	 Flgd.	Diam. Flanges In.
2	$11.00	$13.00	$1.00	$14.25	5¾	8	6
2½	12.00	14.50	1.50	.....	7⅛	8½	7
3	13.50	17.00	2.00	19.00	8	9½	7½
3½	17.50	21.00	2.50	.....	8¾	10½	8½
4	20.00	24.00	3.00	27.00	9⅜	11½	9
5	30.00	34.00	4.00	.....	11¼	13	10
6	36.00	41.00	4.00	45.00	12½	14	11
8	70.00	75.00	7.50	82.50	16	17	13½
10	110.00	115.00	10.00	125.00	19¼	20	16
12	160.00	168.00	12.00	185.00	22¼	24	19
14	......	340.00	.....	340.00	....	28	21
16	......	450.00	.....	450.00	....	32	23½
18	......	600.00	.....	600.00	....	....	25
20	......	700.00	.....	700.00	....	....	27½
24	......	1000.00	.....	1000.00	....	....	32

Lunkenheimer Bronze Renewo Straightway or Y Blow-Off Valves

Union Bonnet, Screwed Ends

200 Lbs. W. S. P., 500° F.
300 Lbs. W. S. P., 550° F.



This valve is not confined to blow-off service but may be used for other purposes, wherever a straightway valve is desired. Has practically unrestricted flow. Long cylindrical guide prevents accumulations of sediment in neck of body, protects stem threads and insures proper seating of disc. Seating surfaces are regrindable, and all parts, including nickel alloy seat and disc, are renewable. Stuffing box is repackable under pressure with valve wide open.

No. 180, Medium

Size......in.	¾	1	1¼	1½	2	2½
No. 180......each	$9.00	10.50	14.50	19.00	30.00	60.00
Face to Face......in.	3 13/16	4½	5 3/16	5 13/16	7	8 3/16

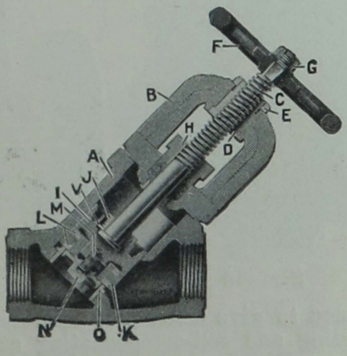
No. 183, Extra Heavy

Size......in.	¾	1	1¼	1½	2	2½
No. 183......each	$13.00	16.50	20.50	35.00	49.00	94.00
Face to Face.....in.	3 15/16	4⅝	5⅜	6	7 3/16	8 7/16

Lunkenheimer Iron Body Straightway or Y Blow-off Valves

Outside Screw, Flanged Yoke Bonnet

125 Lbs. W.S.P., 450° F.



No. 935, Screwed
Sectional View

The disc is reversible and the disc face alloy can be melted out and replaced when worn. The disc locknut is provided with an annular extension which protects the disc face and also provides a self-cleansing flow across the seating surface. The seat, disc and all other parts of the valve are renewable. All stem bearings—stuffing box, gland and yoke—are bronze bushed.

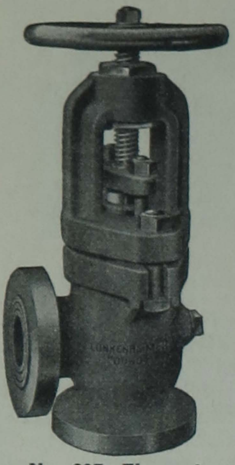
Orders should specify number and size.

Size In.	Face to Face Inches Screwed	 Flanged	Diam. Flanges In.	Price, Each No. 935 Screwed	 No. 305 Flanged
1½	6½	9	5	$13.00	$14.50
2	7 15/16	10⅜	6	16.50	18.00
2½	9⅛	11⅝	7	22.00	25.00

Lunkenheimer Duro Iron Body Blow-Off Valves

Outside Screw, Flanged Yoke Bonnet

250 Lbs. W. S. P., 450° F.



No. 897, Flanged

The Duro Valve is of the angle type, which not only permits an unobstructed flow opening through the valve greater than the nominal area of the connecting pipe, but also lends itself most readily to a seat and disc construction which affords maximum protection to these parts when blowing down, and causes effective cleansing of the seating surfaces immediately prior to valve closure. All parts are renewable.

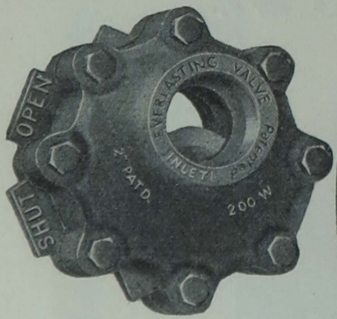
Provided with stem of a special bronze composition mounted and guided in bronze bushings; and, unless otherwise ordered, with a double faced, reversible disc having seating faces of Disc-alloy. Seat and seat ring bushing are made of bronze.

Nos. 896 and 897 have alloy disc faces, bronze seat and seat bushing. Nos. 1582 and 1583 have solid monel disc and nickel alloy seat.

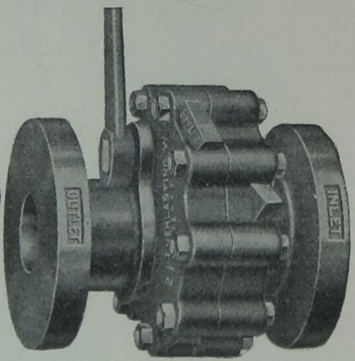
	Screwed			Flanged			
Size In.	No. 896 Each	No. 1582 Each	Center to End In.	No. 897 Each	No. 1583 Each	Center to Face In.	Diam. Flanges In.
1¼	$10.70	......	2⅝	$12.00	......	3¾	5¼
1½	12.50	$70.00	2⅞	14.00	$75.00	4¼	6⅛
2	16.00	90.00	4⅛	18.00	95.00	4⅝	6½
2½	21.00	115.00	4¾	23.00	120.00	5¼	7½

Model W Everlasting Iron Body Blow-Off Valves

For 250 Pounds Steam Working Pressure



Screwed

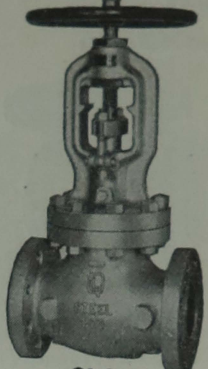


Flanged

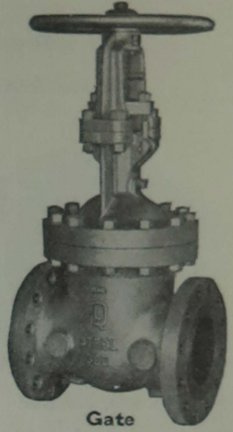
Designed to give continual, uninterrupted service, being self-grinding and self-compensating at all points. Every valve is carefully inspected and tested; all valves for boiler and other high pressure service are worked under 250 pounds steam pressure before leaving the factory.

	Each				Approximate Face to Face In.		
			Rack and Pinion				
Size In.	Screwed	Flanged	Screwed	Flanged	Screwed	Flanged	Diam. Flanges In.
¼	$9.00	.....	.....	.....	2⅛	....	....
⅜	9.00	.....	.....	.....	2½	....	....
½	9.00	.....	.....	.....	2½	....	....
¾	11.00	.....	.....	.....	3	....	....
1	11.00	$15.00	.....	.....	3½	7¼	4⅞
1¼	16.00	19.00	.....	.....	3⅜	7¼	5¼
1½	22.00	26.00	.....	.....	4¼	8⅛	6⅛
2	25.00	30.00	$34.50	$39.00	4⅜	8⅞	6½
2½	32.00	39.00	40.00	48.00	5⅛	10¼	7½
3	44.00	50.00	54.00	60.00	6⅜	11⅞	8¼
4	60.00	70.00	71.00	81.00	6⅞	12	10
5	.....	.....	95.00	100.00	7	12½	11
6	.....	.....	110.00	117.00	7½	13	11

Lunkenheimer Steel Valves



Globe



Gate

Steel valves are available for:
150-Pound W.S.P., 250-Pound G.L.P.
300-Pound W.S.P., 500-Pound G.L.P.
400-Pound W.S.P., 750-Pound G.L.P.
600-Pound W.S.P., 1000-Pound G.L.P.
900-Pound W.S.P., 1500-Pound G.L.P.
1500-Pound W.S.P., 2500-Pound G.L.P.

Lunkenheimer Steel Valves are made in accordance with the American Standards Association. They are designed in a variety of types and sizes and for all prevailing pressures and temperatures.

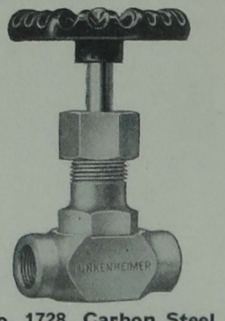
As no one combination of materials is suitable for all conditions, a choice of materials as well as types is available. Bodies and bonnets may be made of carbon or alloy steels, and trimmings of various alloys selected to suit the installation.

Valves may be constructed for flanged or welded piping and equipped with motor control or gearing.

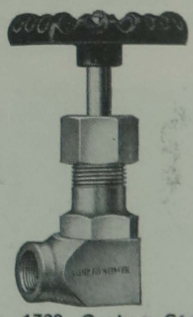
Prices upon application.

Lunkenheimer Steel Needle Valves

3000 Lbs. G.L.P., 150° F.



No. 1728, Carbon Steel
No. 1730, Stainless Steel



No. 1729, Carbon Steel

Nos. 1728 and 1729 have carbon steel body, hub, stem, stuffing box nut, and stainless steel gland. They are suitable for controlling natural and artificial gas, oil free from sulphur compounds, and for other fluids which do not attack carbon steel.

No. 1730 is made of stainless steel and is intended primarily for controlling oil containing sulphur compounds.

The valves are identical in design. They have an extra long pipe thread in the body. The deep thread provides ample clearance over the end of pipe to prevent jamming against the back wall and choking the port.

	Globe			Angle		
Size In.	No. 1728 Carbon Steel Each	No. 1730 Stainless Steel Each	Face to Face In.	No. 1729 Carbon Steel Each	Center to Face In.	Diam. Seat Open. In.
⅛	$2.00	$4.00	1⅞	....	..	⅛
¼	2.00	4.00	2	$2.15	1	⅛
⅜	2.20	4.40	2¼	....	..	3/16
½	2.75	5.50	2⅜	....	..	¼

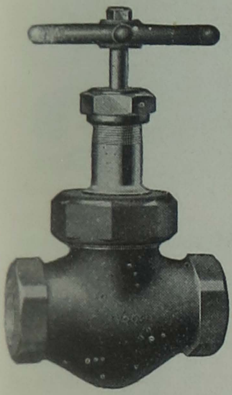
Vogt Drop Forged Steel Gate Valves

For 600 Pounds Oil Service

Screw Ends, Union Bonnet, Ground Joint, Inside Screw Stem, Removable Seats, Solid Wedge

Working Pressure, 600 Pounds at 800° F.

Non-Shock Cold Working Pressure, 1500 Pounds



Recommended for non-corrosive oils and other non-corrosive fluids (if steel trimmed) at high pressures and high temperatures indicated. Valve is furnished stainless steel trimmed when required for corrosive oils, etc. A ground joint instead of a flat gasket is between body and bonnet.

Valve can be repacked under pressure. Seats are rolled in place instead of screwed and can be easily reseated.

Size ¼-inch can be furnished, using ⅜-inch size, bushed with steel bushings.

Size In.	Trimmings Steel No.	Each	Monel Metal No.	Each	Stainless Steel No.	Each	Face to Face In.	Wt. Lbs.
⅜	5102	$13.85	5202	$16.85	5302	$16.85	3⅝	5¾
½	5103	13.85	5203	16.85	5303	16.85	3⅝	6
¾	5104	18.15	5204	21.85	5304	21.85	4⅜	9
1	5105	21.40	5205	25.85	5305	25.85	5	12
1¼	5106	30.60	5206	36.85	5306	36.85	6	19
1½	5107	38.85	5207	48.85	5307	48.85	6¾	32
2	5108	53.00	5208	65.00	5308	65.00	8¼	47

Vogt Drop Forged Steel Globe Valves

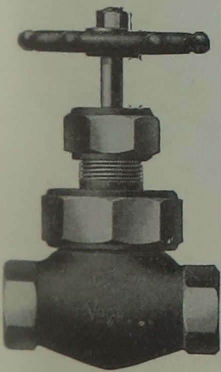
For 600 Pounds Oil Service

Screw Ends, Union Bonnet, Ground Joint, Inside Screw Stem, 70° Removable Seat, Loose Disc

Steel, Monel Metal and Stainless Steel Trimmings

Working Pressure 600 Pounds at 800° F.

Non-Shock Cold Working Pressure 1500 Pounds



This type of valve is recommended for non-corrosive oils and other non-corrosive fluids (if steel trimmed) at the high pressures and high temperatures indicated above. Valve is furnished stainless steel trimmed when required for corrosive oils, etc.

A ground joint instead of a gasket is between body and bonnet.

Valve can be repacked under pressure.

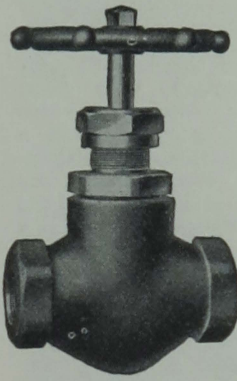
Seat and disc are very easily reground or replaced.

Size In.	Trimmings Steel No.	Each	Monel Metal No.	Each	Stainless Steel No.	Each	Face to Face In.	Wt. Lbs.
¼	3011	$10.00	3041	$10.80	3071	$10.80	3⅛	3¾
⅜	3012	10.00	3042	10.80	3072	10.80	3⅛	3¾
½	3013	12.50	3043	13.35	3073	13.35	3⅝	5¾
¾	3014	14.00	3044	15.00	3074	15.00	4⅜	8¼
1	3015	15.50	3045	17.50	3075	17.50	5	12¾
1¼	3016	22.50	3046	25.00	3076	25.00	6	18
1½	3017	29.00	3047	33.35	3077	33.35	6¾	29¾
2	3018	38.50	3048	45.00	3078	45.00	8¼	42

Vogt Drop Forged Steel Globe Valves

For 1500 Pounds Hydraulic Service

Screw Ends, Screw Bonnet, Inside Screw Stem, Removable 70° Type Seat, Plug Stem



Working Pressure, 1500 Pounds at 450° F.

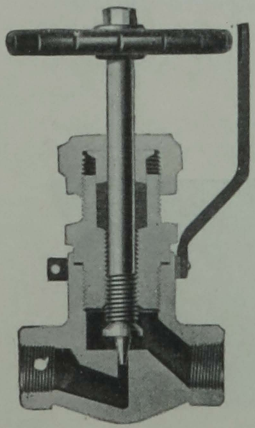
This type valve is recommended for hydraulic service at high pressure if stainless steel trimmed; and for non-corrosive fluids if steel trimmed, with temperatures not exceeding 450° F.

A gasket joint is between body and bonnet.

Valve can be repacked under pressure.

One-piece plug type stem and removable seat are easily reground or replaced.

Size In.	Trimmings Steel No.	Each	Monel Metal No.	Each	Stainless Steel No.	Each	Face to Face In.	Wt. Lbs.
¼	1631	$9.00	1621	$10.00	1651	$10.00	3⅛	3½
⅜	1632	9.00	1622	10.00	1652	10.00	3⅛	3½
½	1633	11.00	1623	12.50	1653	12.50	3⅝	5¼
¾	1634	12.00	1624	13.50	1654	13.50	4⅜	8¾
1	1635	13.50	1625	15.00	1655	15.00	5	12¾
1¼	1636	18.00	1626	20.00	1656	20.00	6	18½
1½	1637	23.00	1627	26.50	1657	26.50	6¾	28½
2	1638	35.00	1628	40.00	1658	40.00	8¼	41



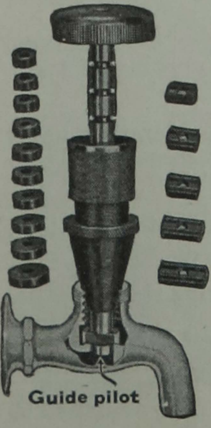
Vogt Drop-Forged Steel Ammonia Expansion Valves

Screw Ends—Screw Bonnet—Inside Screw Stem—Integral Seat—Needle Point Stem—Steel Trimmings

Working Pressures to 1500 Pounds With Cold Liquids

Size In.	Globe No.	Each	Angle No.	Each
¼	158	$9.50	2841	$9.50
⅜	159	9.50	2842	9.50
½	160	10.50	2843	10.50
¾	161	11.50	2844	11.50
1	162	12.50	2845	12.50
1¼	163	15.00	2846	15.00

Skinner Self-Aligning Bibb Reseaters



For reseating flat seat bibbs in place.

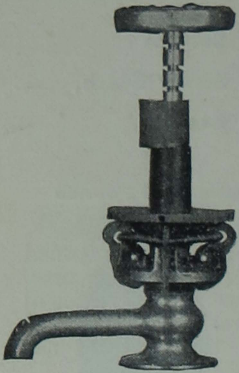
Five Skinner cutters and 12 pilots cover all flat seat bibbs, ¼ to ¾ inch. Cutters are guaranteed to stay sharp.

In operating, cutter is held down to seat by a feed screw. Tool cannot chatter; leaves the seat smooth as glass.

Packed in a strong canvas bag; the cutters and guide pilots are strung on a special wire clip.

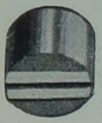
Price, Complete........... each **$4.50**

Skinner Utility Reseaters

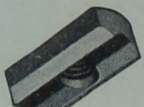


This set reseats anything and everything from 1-inch down in bibbs, ¾-inch down in valves, flat, taper, or oval seat. Queer-shaped bibbs, expensive deep bath cocks, hard-to-replace ball cocks, small valves and gauge cocks are re-cut with ease.

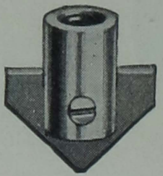
Has an external chuck with four dogs which contract at a turn of the cone and seize the body of the valve in a solid chuck grip. Having a fixed chuck to work from, the mechanical feed on this reseater holds the cutter down to its work and by an occasional slight turn of the feed nut, advances the cut a few thousandths of an inch at a time.



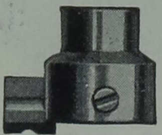
Round Cutter
⅛ to ⅜ inch



Parallel Cutter
⅜ to 1 inch



45° Cutter
⅛ to 1 inch



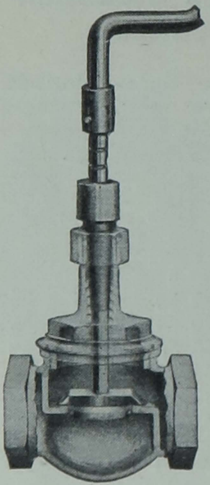
Oval Cutter
¼ to ¾ inch

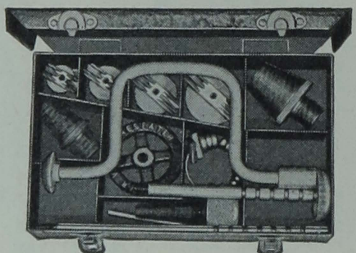
There are 16 cutters giving a range of sizes and shapes as shown.

The oval seat cutter may be used for cutting a new raised seat where a fixture has been reseated so many times that the raised seat is entirely cut off.

Price, Complete, with 16 Cutters, Packed in a Case ....each **$18.50**

Skinner Valve and Bibb Reseating Tools





Reseats all flat and taper seat globe valves, bibbs, faucets, wall shower fixtures, ball cocks and other plumbing fixtures, in place, quickly and accurately.

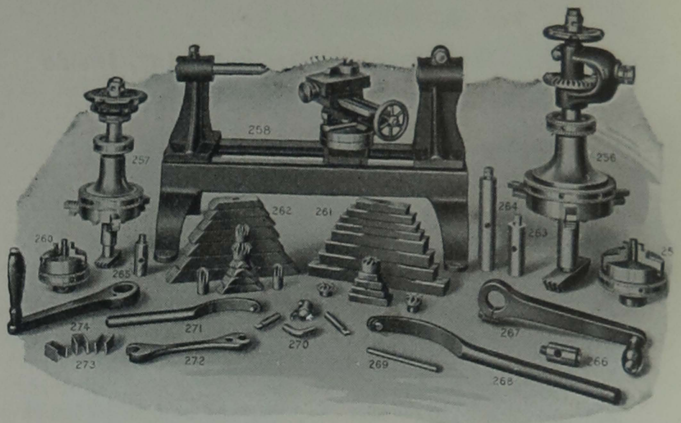
With its guaranteed Skinner cutters, operating under screw feed, it leaves the worn old seat glass-smooth, level, absolutely accurate and tight.

It is a real precision tool. Perfect alignment on all sizes, all jobs.

The valve or bibb stays in the line during reseating.

For ¼ to 2-Inch Valves and ¼ to ¾-inch Bibbs,
Weight, 6 Pounds..........................each **$20.00**
For ¼ to 3-Inch Valves and ¼ to ¾-Inch Bibbs,
Weight, 12 Pounds..........................each **30.00**

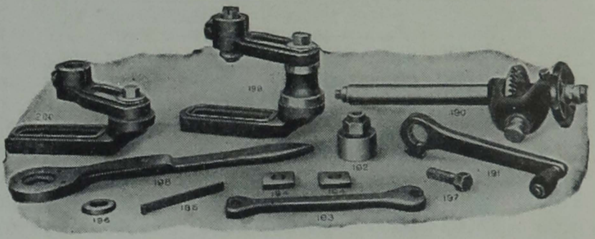
Dexter Globe Valve Reseating Machines



Complete outfits for reseating flat and taper seated valves.

Outfit No.	For Valves Size Inches	Price Each	Outfit No.	For Valves Size Inches	Price Each
3T-L	¼ to 3	**$115.00**	8T-L	¼ to 8	**$300.00**
4T-L	¼ to 4	**135.00**	12T-L	½ to 12	**525.00**
6T-L	¼ to 6	**200.00**	8T-L Spec.	¼ to 8	**350.00**

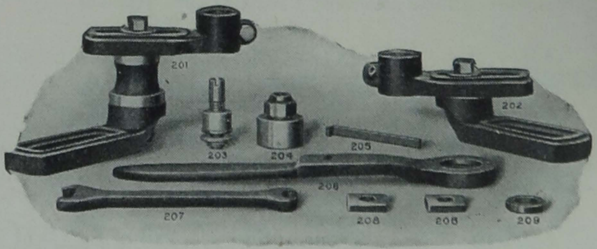
Dexter Pump Valve Reseating Machines



No. D-H-6 is for recutting valve seats of duplex, triplex and single cylinder plunger, boiler feed, vacuum, underwriter, mine and general service pumps. No. N-15 is for the larger valve pumps.

Outfit No.	Cap. for Refacing Seats, In.	Price Each	Outfit No.	Cap. for Refacing Seats, In.	Price Each
D-H-6	2 to 7½	**$46.25**	N-15	8 to 15	**$81.25**

No. D-M-6 Dexter Pump Attachments



For use with the tool shaft and bearing sleeve of the No. 6T-L Globe Valve Reseating Machine.

The double yoke makes a rigid attachment for firmly attaching the machine to pump valve chamber.

Price of cutters should be added to price of attachment.

Capacity for Reseating....................inches 2 to 7½
Price, No. D-M-6, without Cutters..........each **$30.00**

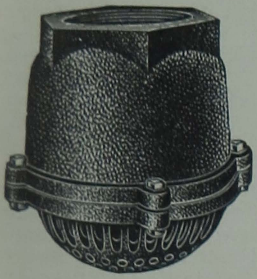
S. & W. Patent Pump Seat Valve Cutters

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
2	**$16.75**	**5**	**$22.50**	**8**	**$37.50**
2½	**16.75**	**5½**	**22.50**	**10**	**62.50**
3	**18.75**	**6**	**22.50**	**12**	**81.25**
3½	**18.75**	**6½**	**27.50**	**14**	**93.75**
4	**18.75**	**7**	**27.50**	**15**	**100.00**
4½	**18.75**	**7½**	**27.50**	..	......

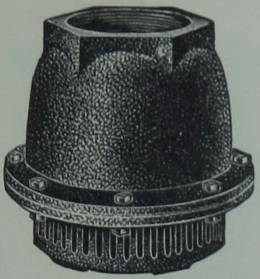
Iron Body Foot Valves

With Strainer

Leather Disc



No. 2245, ¾ to 6-Inch



No. 2245, 8 to 16-Inch

Screwed

I.P. Size Inches	Each		I.P. Size Inches	Each	
	Black	Galvanized		Black	Galvanized
¾	$1.15	$1.75	3½	$5.60	$8.50
1	1.30	2.00	4	7.30	11.00
1¼	1.40	2.10	5	11.25	16.75
1½	1.90	2.85	6	14.75	22.00
2	2.40	3.60	8	41.00	62.00
2½	3.30	5.00	10	64.00	110.00
3	3.90	5.75	12	100.00	155.00

Flanged

I.P. Size Inches	Diam. Flanges Inches	Each		I.P. Size Inches	Diam. Flanges Inches	Each	
		Black	Galvanized			Black	Galvanized
2	6	$3.50	$5.50	6	11	$17.50	$27.00
2½	7	4.50	7.00	8	13½	45.00	72.00
3	7½	5.75	9.00	10	16	70.00	120.00
3½	8½	7.50	12.00	12	19	112.00	170.00
4	9	9.50	15.00	14	21	150.00	......
5	10	14.00	22.00	16	23½	200.00	......

Clearflow Dependable Foot Valves

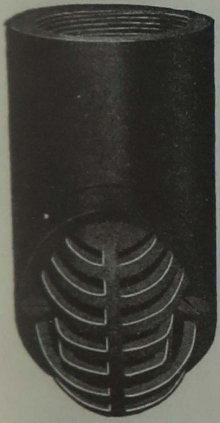


Fig. No. 3
Facing View

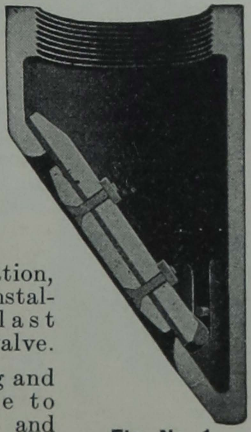


Fig. No. 1
Profile View

Valve is water tight even at low pressures.

Only foot valve having small outside diameter with full water way. Silent dependable operation, in normal installations will last life of pump valve.

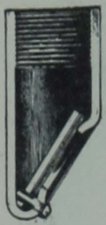
Self-cleaning and sand-proof due to inclined seat and patented hinge.

Figure 1 consists of cast iron body, the 1¼-in. and 1½-in. being equipped with brass flappers and vulcanized rubber facings. Sizes 2-in. and up are equipped with steel and bronze flappers with bolted facings. Leather facings can be furnished upon request in larger sizes. Figure 1 equipped with unbreakable screen is known as figure 3.

Std. Pipe Size Inches	O.D. Casing In.	Without Screen Fig. 1		With Screen Fig. 3		O.D. In.	Approx. Wt. Lbs.	
		Black	Galv.	Black	Galv.		Fig. 1	Fig. 3
1¼–1½	....	$1.75	$2.00	$2.25	$2.50	2⅜	1¾	2
2	....	3.00	3.50	3.75	4.25	3⅛	3½	4½
2½	3	6.00	6.75	8.00	9.00	4⅜	9	10½
3	3½	8.00	9.50	9.50	10.75	4⅞	11½	13
3½	4	10.00	11.75	13.00	15.00	5⅝	15½	18
4	5	13.00	15.00	15.50	18.00	6½	20	24
5	6	18.00	21.00	21.25	24.75	7½	31	36
6	7	24.00	29.00	28.00	33.00	8⅝	46	52
7	8	32.00	38.00	38.00	45.00	9⅝	60	70
8	9	40.00	48.00	48.00	58.00	10¾	78	96
	10	45.00	51.00	54.00	61.00	11⅛	80	100

No. 300 Clearflow Foot Valves

All Brass



This all brass foot valve is seamless and non-corrosive. It has small outside diameter and unrestricted flow—equal to that through open suction pipe.

Quick closing—only 20 degrees valve travel, non-slamming on inclined seat.

The valve is self-cleaning; vulcanized rubber facing is unaffected by sand or grit.

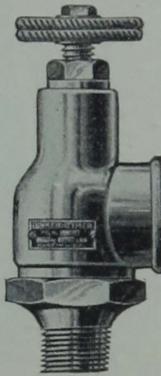
Long wearing; the non-fouling metal hinge lasts the life of a pump.

Standard Pipe Size	inches	¾	1	1¼
No. 300	each	$1.25	1.50	1.75
Outside Diameter	inches	1$\frac{3}{16}$	1⅜	1¾
Approximate Weight	ounces	4	6	9

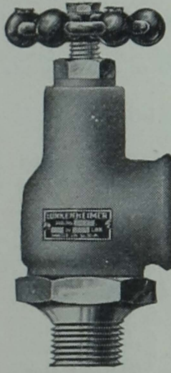
Lunkenheimer Bronze Relief Valves

For Water or Liquid Service

10 to 250 Pounds Pressure



No. 791 Male Inlet
Side Outlet, Finished
Bronze Regulating Wheel



No. 996 Male Inlet
Side Outlet, Rough
Iron Regulating Wheel

Outlet connection on side outlet valves is the same size as inlet.

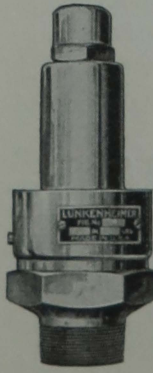
Order should specify number, size of inlet and pressure at which valve is to relieve.

Size Inlet and Outlet Inches	Price, Each		Size Inlet and Outlet Inches	Price, Each	
	No. 791 Male No. 288 Female Finished with Bronze Wheel	No. 996 Male No. 997 Female Rough with Iron Wheel		No. 791 Male No. 288 Female Finished with Bronze Wheel	No. 996 Male No. 997 Female Rough with Iron Wheel
⅜	$4.40	$4.20	1½	$8.40	$7.70
½	4.60	4.30	2	13.50	12.50
¾	4.90	4.50	2½	20.50	19.00
1	5.50	5.00	3	33.00	31.00
1¼	6.60	6.00	...	.....	.....

No. 1211 Lunkenheimer Bronze Air-gas Pop Relief Valves

Encased Spring, Top Outlet

10 to 250 Lbs. Pressure



The construction of the huddling chamber permits regulation of pressure reduction—difference between pressures at time of opening and closing. Order should specify size of inlet, class of service,—air, gas, etc.,—and pressure at which valve is to relieve. Has cap, integral seat and male inlet.

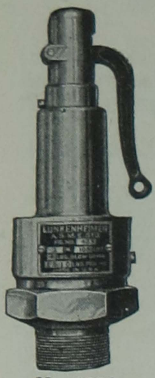
Size Inlet In.	No. 1211 Price Each	Size Inlet In.	No. 1211 Price Each
⅜	$8.50	1½	$16.50
½	9.00	2	25.50
¾	9.50	2½	40.00
1	10.80	3	54.00
1¼	12.70	...	.....

Lunkenheimer Bronze Pop Safety Valves

For Air Service

With Lever

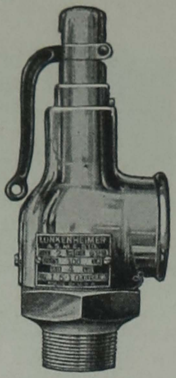
For 10 to 250 Pounds Pressure



No. 1226

Size Inches	Price, Each No. 1226 Male Inlet Top Outlet	 No. 1227 Male Inlet Side Outlet
⅜	$10.00	$12.00
½	10.50	12.50
¾	11.00	13.00
1	12.30	14.20
1¼	14.50	16.30
1½	18.50	20.30
2	28.00	29.50
2½	45.00	49.00
3	60.00	66.00

Special pressure settings, prices on request.

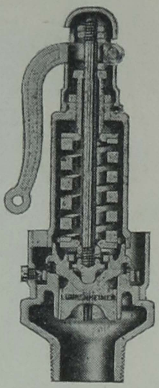


No. 1227

No. 433 Lunkenheimer Bronze Pop Safety Valves For Steam

Encased Spring, Top Outlet

10 to 250 Pounds Pressure



Has male inlet.

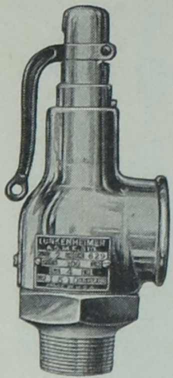
When ordering, state size of inlet and pressure at which valves are to relieve.

Size Inlet Inches	Each	Size Inlet Inches	Each
⅜	$5.50	1½	$11.50
½	6.00	2	18.00
¾	6.50	2½	28.00
1	7.50	3	38.00
1¼	9.00	...	.....

No. 629 Lunkenheimer Bronze Pop Safety Valves For Steam

Encased Spring, Side Outlet

10 to 250 Pounds Pressure



Outlet connection of encased spring valves is one size larger than the inlet. Has male inlet.

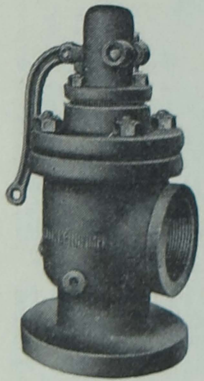
When ordering, state size of inlet and pressure at which valves are to relieve.

Size Inlet Inches	Each	Size Inlet Inches	Each
⅜	$6.00	1½	$12.40
½	6.50	2	19.50
¾	7.00	2½	30.00
1	8.20	3	41.00
1¼	9.80	...	.....

No. 630 Lunkenheimer Iron Body Pop Safety Valves for Steam

Bronze Mounted, Encased Spring, Angle Outlet

5 to 250 Lbs. Pressure



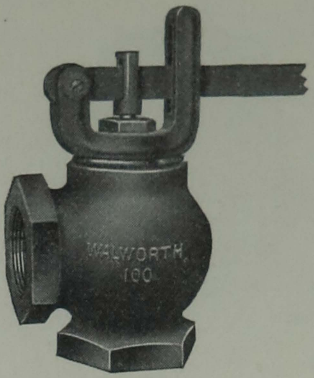
Has flanged inlet and female screwed outlet.

Size Inlet In.	No. 630 Bronze Seat Each	No. 630 Nickel Alloy Seat Each	No. 36 Testing Clamp Each	Center to Face of Inlet In.	Diam. Flanges In.
2	$22.00	$29.00	$3.00	4⅝	6½
2½	32.00	42.00	3.50	5	7½
3	40.00	52.00	4.00	5 11/16	8¼
3½	56.00	73.00	5.00	6⅜	9
4	72.00	94.00	6.00	7 1/16	10
4½	84.00	110.00	7.00	7¾	10½

Walworth Iron Body Safety Valves

Brass Mounted

For 100 Pounds Working Steam Pressure



Angle

This type of safety valve does not have positive opening or closing points and should therefore be set slightly higher than the working pressure carried on the apparatus to which it is connected to prevent leakage past the seat.

Sizes 1 to 3 inches inclusive have brass screwed top; larger sizes have cast iron top bolted on and can be set at any 90° angle. Stem, disc, and seat ring are brass. Levers are graduated from 30 to 100 pounds. Can be furnished with any other graduation not exceeding 100 pounds at a special price.

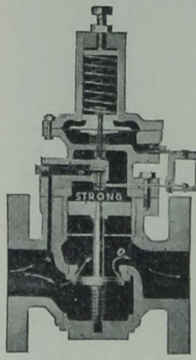
Size Inches	Screwed No. 990 Angle, No. 991 Cross Each	 Center to Inlet and Outlet Inches	Flanged No. 990F Angle, No. 991F Cross Each	 Center to Face Inlet and Outlet Inches	 Diameter Flange Inches
1	$4.00	1⅞	......	...	....
1¼	5.00	2¼	......	...	....
1½	5.80	2½	......	...	....
2	7.80	2⅞	$10.25	4	6
2½	13.25	3⅜	16.00	4¼	7
3	17.25	4¼	21.50	4¾	7½
3½	23.00	4⅝	27.50	5¼	8½
4	28.75	5	34.00	5¾	9
5	41.50	6	48.00	6½	10
6	57.75	6¾	65.00	7	11
8	132.00	8¼	140.00	8½	13½

Flanged valves will be shipped faced only, unless otherwise specified.

Type C Strong Pressure Regulators

Super-Sensitive Type

For Any Initial Pressure of 225 Pounds (400° F.) or Less



A packless pilot operated single seated valve for air, steam or gas. Reduced pressure range may be changed by exchanging pilot spring. Reduced pressure ranges: 0 to 10 Lbs., 40 to 100 Lbs.; 10 to 50 Lbs., 100 to 200 Lbs.

With no pressure on the valve, the pilot valve is open and the main valve closed. When pressure is turned on, the high or inlet pressure is admitted to the top of the piston. The piston having a greater area than the seat is forced down opening the main valve and admitting pressure to the reduced or downstream side of the valve.

Size In.	Semi-Steel Each	Cast-Steel Each	Distance Between Flanges In.	Distance Center Valve to Top of Pilot, In.	Approx. Weight Pounds Boxed
½	$36.00	$53.00	*	12	19
¾	39.00	53.00	*	12	19
1	43.00	53.00	*	12	19
1¼	46.00	100.00	7½	12¾	46
1½	48.50	100.00	7½	12¾	46
2	60.00	130.00	8⅝	13	56
2½	79.00	150.00	9½	13¾	75
3	95.00	170.00	10	14¾	98
4	145.00	210.00	10⅞	16	125
5	190.00	......	14¼	17	180
6	250.00	......	16⅝	17½	310
8	350.00	....	21	22	650

*Distance between screwed ends, 4½ inches.

Prices do not include companion flanges. Regular valves are extra heavy (250 pounds) standard.

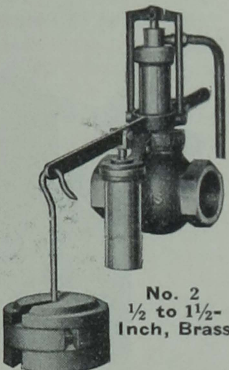
When ordering valves, give size and type, the initial (upstream) and reduced (downstream) pressures, as well as service, i.e., steam, gas or air.

Sizes larger than 8 inches and cast steel valves in sizes above 4 inches, prices upon application.

Davis Pressure Regulators

Counterweighted Piston Type

For 250 Pounds Maximum Initial and 2 Pounds Minimum Service Pressure

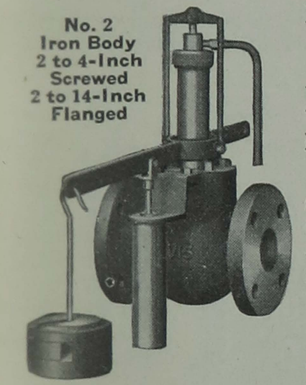


No. 2 ½ to 1½-Inch, Brass

Wherever steam is used at a higher pressure than is necessary to properly perform the service there is needless waste. The lower the service pressure the higher the operating efficiency.

Reducing the pressure one half makes an approximate saving in steam consumption of 50 per cent—the greater the reduction the greater the saving.

The Davis Regulator will automatically reduce any high initial pressure down to any desired service pressure. Having a balanced inner valve it maintains a constant reduced pressure regardless of high pressure fluctuations. It functions like a lever scale —pressure is balanced by counterweights. To change the delivery pressure simply change the weights.

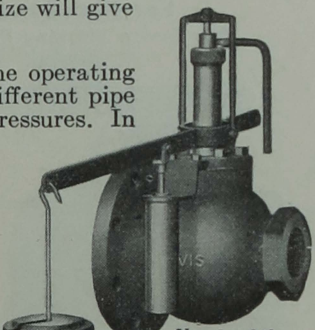


No. 2 Iron Body 2 to 4-Inch Screwed 2 to 14-Inch Flanged

This valve has no springs or toggles, no diaphragm, no auxiliary valve, no small ports, and no packing. Its action is visible.

Standard regulators are made for steam. Valves of the same outward appearance are constructed for air and water, but have the internal movable parts especially made for the service.

The initial and reduced pressures and the volume of steam determine the proper size of regulator to be used for a given condition. The Davis Regulator has full pipe capacity. If pipe sizes have been correctly determined, a regulator of the corresponding size will give good service.



No. 3 with Expanded Outlet

It is frequently found that the operating conditions require the use of different pipe sizes for the high and reduced pressures. In such instances it is advantageous to use a regulator with expanded outlet (No. 3).

Steel regulators with monel metal or other suitable trimmings are made to order for pressures up to 600 pounds and 750° total temperature. Prices upon application.

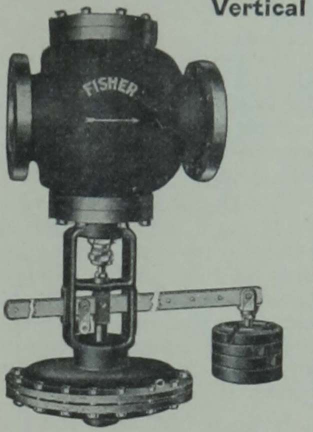
Size Inches	Price, Each			Size Inches	Price, Each	
	Screwed	Standard Flanged	Ex. Hy. Flanged		Standard Flanged	Ex. Hy. Flanged
½	$45.00	......	......	5	$175.00	$185.00
¾	45.00	......	......	6	225.00	235.00
1	50.00	......	......	7	300.00	325.00
1¼	55.00	......	......	8	375.00	400.00
1½	60.00	$65.00	$70.00	10	575.00	600.00
2	70.00	75.00	80.00	12	825.00	850.00
2½	85.00	90.00	95.00	14	1025.00	1075.00
3	100.00	105.00	110.00	..	....	....
3½	120.00	125.00	130.00	..	....	....
4	140.00	145.00	150.00	..	....	....

With Expanded Outlet

1 x2	$55.00	......	......	4x 6	$175.00	$185.00
1¼x2½	60.00	......	......	4x 8	200.00	210.00
1½x3	70.00	$75.00	$80.00	5x 8	250.00	265.00
2 x3	80.00	85.00	90.00	5x10	300.00	315.00
2 x4	85.00	90.00	95.00	6x 8	350.00	365.00
2½x5	......	105.00	110.00	6x10	400.00	415.00
3 x5	......	120.00	125.00	6x12	425.00	440.00
3 x6	......	130.00	135.00	8x10	450.00	475.00
3½x7	......	150.00	160.00	8x12	500.00	525.00

No. 10A Fisher Reducing Valves

Vertical or Inverted



This valve is applicable to a wide range of conditions, reducing steam, air, water, gas or oil. If valve is to be used on anything besides steam, complete information as to nature of installation must be given.

Type No. 10A is now offered with a much heavier and improved yoke. Can be installed with top work either above or below pipe line by simply shifting lever in the yoke.

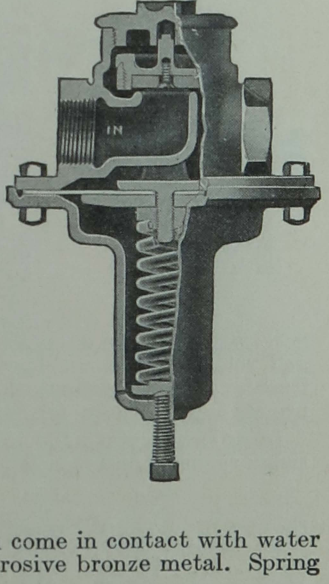
When ordering specify maximum and minimum high and low pressure, and kind of service.

Globe or Angle

Pipe Sizes In.	Semi-Steel Body Duromite Bronze or Nickel Iron Trim			Semi-Steel Body Nickel Alloy or 18-8 Stainless Steel Trim			Cast Steel Body Nickel Alloy or 18-8 Stainless Steel Trim	
	Screwed Each	Standard Flanged Each	Extra Heavy Flanged Each	Screwed Each	Standard Flanged Each	Extra Heavy Flanged Each	Screwed Each	Series 30 Series 40 Flanged Each
*½-¾	$37.50	$45.00	$47.50	......	......	......	......	......
½-¾	40.00	47.50	50.00	$65.00	$72.50	$75.00	$105.00	......
1	45.00	52.50	55.00	65.00	72.50	75.00	115.00	$135.00
1¼	50.00	55.00	60.00	70.00	75.00	80.00	125.00	145.00
1½	55.00	60.00	65.00	80.00	85.00	90.00	140.00	165.00
2	60.00	65.00	70.00	90.00	95.00	100.00	170.00	180.00
2½	70.00	75.00	80.00	110.00	115.00	120.00	......	210.00
3	85.00	90.00	95.00	......	130.00	140.00	......	250.00
3½	100.00	105.00	110.00	......	150.00	160.00	......	275.00
4	120.00	125.00	130.00	......	180.00	190.00	......	315.00
5	......	145.00	165.00	......	235.00	250.00	......	400.00
6	......	165.00	185.00	......	270.00	285.00	......	480.00
8	......	270.00	290.00	......	390.00	410.00	......	650.00

*Bronze body.

Type 75 Fisher Water Reducing Valves



A pressure reducing valve or regulator for reducing water pressure in domestic or industrial service— protecting plumbing and other apparatus from excessive pressure.

It is suitable for any initial pressure up to 200 pounds and any service pressure as low as 10 pounds.

Adjustment of the desired reduced pressure is easily made by the adjusting screw in the bottom of the spring case. The spring gives a wide range of reduced pressure. Valve can be furnished for various low pressures, if ordered, but as regularly furnished it is fitted with spring for a range from 5 to 75 pounds.

Body and metal parts which come in contact with water are made from special non-corrosive bronze metal. Spring case is iron, heavily japanned.

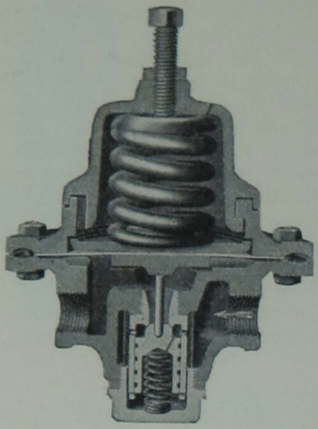
The valve can be used in almost any position, but installation in a horizontal line with the spring case as shown in the illustration is recommended.

In ordering, give pipe size of valve, initial or inlet pressure and final or reduced pressure range, kind of liquid and temperature.

Made with screwed connections only; globe body.

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
½	$15.00	1¼	$32.50	2½	$95.00
¾	20.00	1½	40.00	3	200.00
1	25.00	2	60.00	...	......

No. 13 Davis Automatic Pressure Reducing Valves



For universal use on steam, air and gas pipe lines. Good for initial pressures up to 250 pounds and any reduced pressure between 100 and 1 pound as specified.

The Davis No. 13 Valve affords the means by which automatic pressure reductions may be done simply, efficiently and economically. It will maintain the desired pressure reduction when functioning anywhere from 100 per cent capacity to no flow at all.

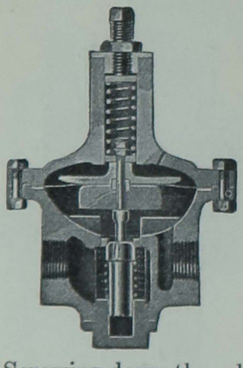
When it is closed, the flow is entirely stopped; there is no leaking.

Spring capacities range as follows: No. 1 spring, 1 to 20 pounds, reduced pressure; No. 2 spring, 20 to 50 pounds; No. 3 spring, 50 to 100 pounds.

Some features of this valve are: Single seat; spring loaded; self-contained; built-in strainer; tight closing disc; high pressure beneath the disc; laminated phosphor bronze diaphragm; spring cap removable by hand; all parts renewable without disturbing pipe connections.

Size Inches	Semi-Steel Body Bronze Trim Each	Bronze Body Bronze Trim Each	Shipping Weight Pounds
3/8	$24.00	$32.00	13
1/2	24.00	32.00	14
3/4	26.00	38.00	18
1	32.00	46.00	21
1 1/4	42.00	60.00	23
1 1/2	52.00	80.00	56
2	64.00	104.00	60

Strong Reducing Valves



Built for medium and low pressure steam heating or other work requiring a reduced pressure of 1 to 85 pounds and for an initial pressure of 160 pounds or less.

The regulator is fitted with a single, Anum-Metl disc and seat, guaranteed for one year; a self contained strainer and a laminated diaphragm.

If the low pressure increases, the diaphragm is forced against the spring and the valve closes, and if the low pressure decreases, the spring forces the valve open. Screwing down the adjusting nut increases the low pressure, and releasing the nut lowers it. This valve will reduce from any initial pressure less than 160 lbs. to any delivery pressure with these ranges furnished: 0–30, 30–50, 40–85.

In ordering, state the initial pressure, reduced pressure range required and mention service—steam, air, water, etc.

Size Inches	Type K Each	Type O Each	Inlet to Outlet Inches	Size Inches	Type K Each	Type O Each	Inlet to Outlet Inches
3/8	.....	$15.00	3 1/4	1	$27.00	.....	4 1/4
1/2	.....	15.00	3 1/4	1 1/4	38.00	.....	6 1/2
1/2	$19.00	.....	3 3/4	1 1/2	42.00	.....	6 1/2
3/4	20.00	.....	3 3/4	...	.....	.....	...

All of the goods we can furnish are not displayed in this catalog.

Tell us your wants and we will cheerfully send manufactures' bulletins or catalogs.

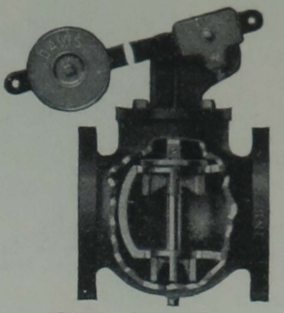
Phone or write

Davis Noiseless Back Pressure Valves

PATENTED

Counterweighted Semi-Balanced Type

For 20 Pounds Maximum Exhaust Steam Pressure



Globe, Screwed
Horizontal Position

The function of this valve is to automatically regulate the pressure of exhaust steam. It is the original semi-balanced noiseless valve with two port openings. One disc of the inner valve partially balances the other. A comparatively small counterweight maintains the back pressure.

The top member of the valve is bevel seated and the bottom one is a piston disc—the tightest possible construction. The seats are bronze brushing rings and the valve is cast iron. A patented construction that positively prevents sticking from expansion.

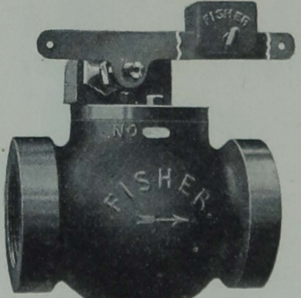
This valve may be used in either a horizontal or vertical pipe line. Less wear will occur if used horizontally.

	Screwed		Flanged			Flanged	
Size In.	Each	Face to Face In.	Std. Each	Face to Face In.	Size In.	Std. Each	Face to Face In.
2	$54.00	7 1/2	$60.00	7 3/4	10	$300.00	19
2 1/2	64.00	7 1/2	70.00	7 3/4	12	400.00	22
3	74.00	8 1/2	80.00	8 1/2	14	600.00	24 1/4
3 1/2	84.00	9 1/4	90.00	9	16	800.00	27 1/2
4	100.00	10 1/4	106.00	10	18	1000.00	29 1/2
5	126.00	11 1/2	132.00	11 1/2	20	1200.00	30 1/2
6	150.00	13 1/4	156.00	13 1/4	24	1600.00	38
7	......	....	190.00	14 1/2	30	2600.00	47
8	......	....	230.00	16 3/4	..	....	....

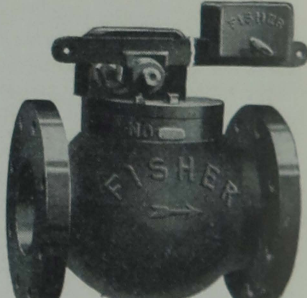
Fisher Noiseless Back Pressure Valves

For Non-Condensing Service Only

For Steam Working Pressures From 5 to 25 Pounds



No. 9, Screwed



No. 9F, Flanged

For use on non-condensing systems, where exhaust steam is used for heating, cooking, drying, or any other purpose where a fixed amount of back pressure must be maintained.

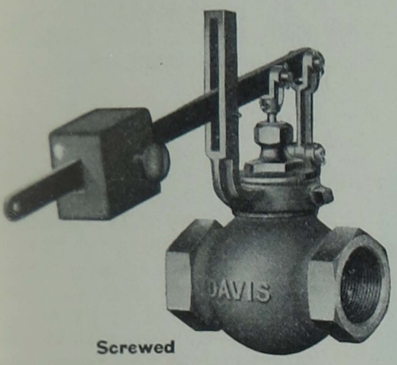
Bodies provided with an opening to which a drain pipe can be connected. Stuffing boxes are large enough to provide ample room for packing.

Cast Iron Inner Valves, Iron or Bronze Seats

	No. 9 Screwed		No. 9F Flanged	
Size Inches	Iron Seats Each	Bronze Seats Each	Iron Seats Each	Bronze Seats Each
1 1/2	$25.00	......	......	......
2	25.00	$30.00	$30.00	$32.50
2 1/2	27.50	32.50	32.50	32.50
3	30.00	37.50	35.00	42.50
3 1/2	35.00	40.00	40.00	50.00
4	40.00	52.50	52.50	55.00
5	65.00	75.00	75.00	85.00
6	90.00	100.00	100.00	110.00
8	140.00	150.00	150.00	170.00
10	200.00	210.00	210.00	240.00
12	260.00	270.00	270.00	300.00

Davis Balanced Valves

For Working Pressures Up to 250 Pounds



Screwed

This popular control valve affords means of governing the flow in pipe lines by means of some force acting on the lever.

Valve is used extensively on the makeup line of feed water heaters and operated by a float. Also with thermostat either directly attached or by remote control.

The seats and disc are beveled, which makes a tighter valve, but the disc is then slightly out of balance. It will function properly on steam, air, gas, water and other fluids.

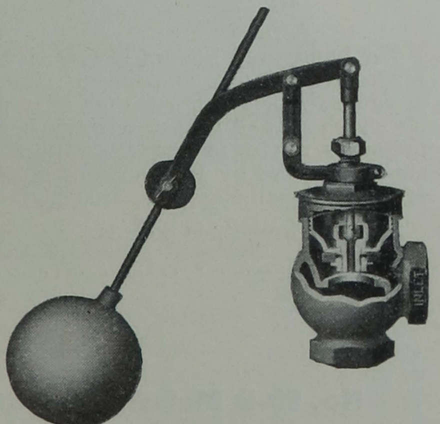
This valve is also made with parallel seats and piston disc, making it perfectly balanced both to inlet and outlet pressures. This is not a tight closing valve and should only be used where there is no objection to a slight leakage.

Size Inches	Standard Screwed Each	Standard Flanged Each	Extra Heavy Flanged Each	Size Inches	Standard Flanged Each	Extra Heavy Flanged Each
½	$20.00	.....	.....	5	$150.00	$160.00
¾	20.00	.....	.....	6	175.00	185.00
1	25.00	.....	.....	7	225.00	250.00
1¼	30 00	.....	.....	8	250.00	275.00
1½	35.00	.....	.....	10	350.00	375.00
2	40.00	$45.00	$50.00	12	500.00	525.00
2½	50.00	55.00	60.00	14	650.00	700.00
3	60.00	65.00	70.00	16	800.00	850.00
3½	80.00	85.00	90.00	18	1000.00	1050.00
4	100.00	105.00	110.00	20	1250.00	1300.00

Davis Float Valves

Globe and Angle Patterns

For 250 Pounds Working Pressure



Screwed

A tank will never overflow if there is a Davis Float Valve on the makeup line. This valve will automatically maintain a constant water level. When it is closed the flow is entirely stopped.

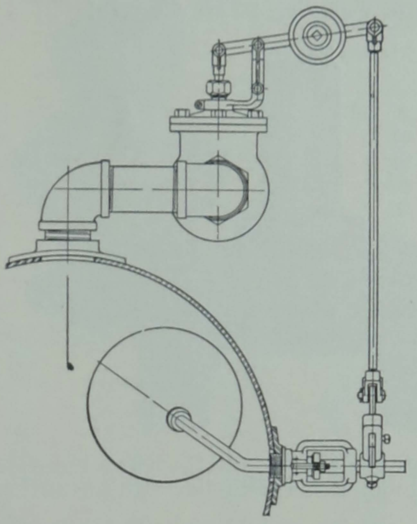
This valve has a single seat with renewable composition disc. It closes tight. Has no leather cup packing.

When valve is seated the inlet pressure which enters on top of disc accumulates in the chamber above the loosely fitted piston. When water level recedes and float drops, it opens the port—the pressure above the piston is relieved and the valve opens.

Sizes 3 inches and smaller are brass valves. Larger sizes have iron body with bronze trim.

Size Inches	Price, Each Standard Screwed	Price, Each Standard Flanged	Size Inches	Price, Each Standard Screwed	Price, Each Standard Flanged
½	$30.00	.....	3½	$120.00	$125.00
¾	30.00	.....	4	130.00	135.00
1	32.00	.....	5	......	160.00
1¼	35.00	.....	6	......	200.00
1½	40.00	$45.00	8	......	400.00
2	50.00	55.00	10	......	500.00
2½	70.00	75.00	12	......	700.00
3	90.00	95.00	..	......	......

No. 170 Davis Fluid Level Controllers

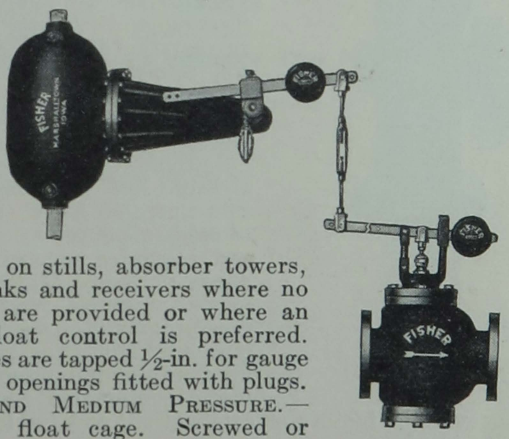


Designed to maintain automatically a constant level in a closed tank by supplying make-up water. Used to control the action of a pump in accordance with fluctuations in the tank water level. An electric switch may be supplied for use with a motor driven pump. Valve opens or closes as water level rises.

The packing box with gland and outboard ball bearing and the shaft, are bronze. A seamless copper float suitable for 125 pounds pressure is furnished. Clevises on valve and shaft levers are tapped for ⅛ inch pipe on controllers with a 6-inch float and for ¼ inch pipe on controllers with 8 and 10-inch floats. A small counterweight is placed on valve lever to work in opposition to the float. Tank flange for holding packing box is not regularly supplied but can be furnished as an extra.

Size In.	With Valve Each	Size Float In.	Packing Box Pipe Thread In.	Size In.	With Valve Each	Size Float In.	Packing Box Pipe Thread In.
¾	$55.00	6	¾	3	$125.00	8	1¼
1	60.00	6	¾	3½	140.00	10	1½
1¼	65.00	6	¾	4	150.00	10	1½
1½	70.00	6	¾	5	200.00	10	1½
2	80.00	8	1¼	6	250.00	10	1½
2½	100.00	8	1¼	...	......	..	...

No. 227C Fisher Liquid Level Controllers



For use on stills, absorber towers, closed tanks and receivers where no manholes are provided or where an outside float control is preferred. Float cages are tapped ½-in. for gauge cocks and openings fitted with plugs.

Low and Medium Pressure.—Semi-steel float cage. Screwed or flanged angle or globe valve body. Semi-steel lever valve, Duromite Bronze stainless iron or stainless steel trimmed. Provided with copper or stainless steel floats.

High Pressure.—Cast steel or drawn steel float cage. Screwed, flanged angle or globe valve body. Stainless steel or nickel alloy trimmed. Stainless steel floats.

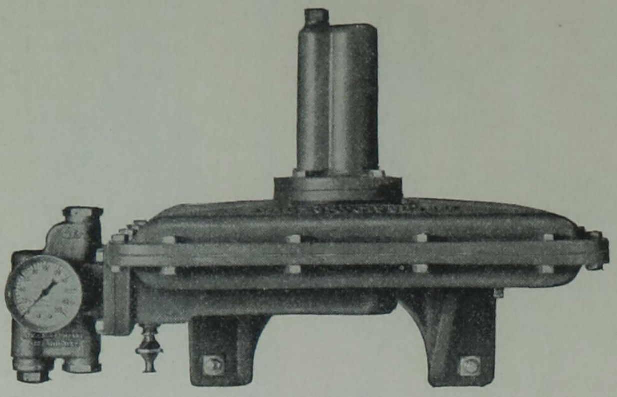
Size Valve In.	Diam. Float In.	Low Pres. Up to 125 Lbs. Each	Med. Pres. Up to 250 Lbs. Each	High Pres. Up to 400 Lbs. Each	Size Valve In.	Diam. Float In.	Low Pres. Up to 125 Lbs. Each	Med. Pres. Up to 250 Lbs. Each	High Pres. Up to 400 Lbs. Each
*½	6	$105.00	$147.50	......	2	..	$137.50	$200.00	$420.00
½	6	107.50	150.00	$270.00	2½	8	147.50	210.00	450.00
*¾	6	105.00	147.50	......	3	8	157.50	220.00	485.00
¾	6	107.50	150.00	270.00	4	8	192.50	255.00	550.00
1	6	112.50	155.00	282.50	5	8	212.50	290.00	635.00
1¼	6	115.00	160.00	297.50	6	8	232.50	310.00	715.00
1½	8	132.50	195.00	400.00	8	10	435.00	545.00	1072.50

*Bronze body valve, bronze trimmed.

NOTE.—Low and medium pressure regularly furnished with copper float, bronze trimmed; high pressure, with stainless steel float and trim.

Type 90 Cash Standard Controllers

For Automatic Furnace Draft Control

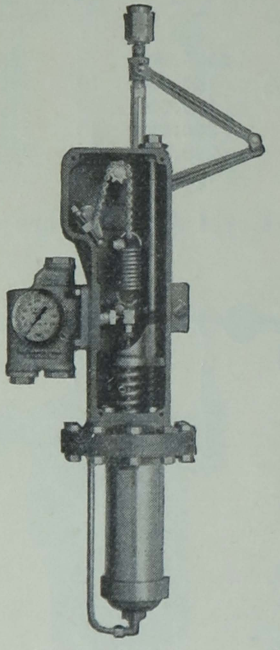


This controller will automatically hold the correct furnace draft in the combustion chamber of the boiler—whether firing with coal, gas, or oil.

It practically eliminates air infiltration, decreases the volume of air handled by the furnace, reduces gas velocity through the boiler and insures correct time for heat absorption. It reduces stack temperature, increases furnace temperature and increases boiler efficiency. It will also insure much higher CO_2.

Complete information and prices upon application.

Type 100 Cash Standard Controllers

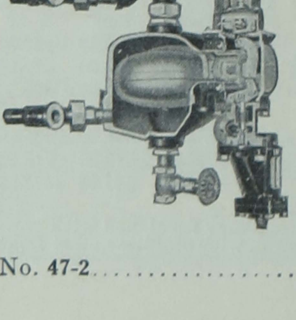


The Cash Type 100 Standard Controller comes in various types but all of them are constructed basically identical; all with the same compensator, the same 4-way valve and all are double acting. To adapt it to the various automatic uses, nothing is changed but the lower part that houses the control diaphragm.

Used to operate balanced valves, chronometer valves, butterfly valves regardless of size, dampers, electric rheostats, stokers, pulverizers, fans and other apparatus driven by engines, turbines or electric motors.

Suitable for pressures between absolute and 600 pounds gauge, this controller has a wide variety of uses—all automatic. Reduces and regulates pressure whether above or below atmosphere; relieves pressure; controls back pressure; maintains a liquid level either by admitting or discharging fluid; for the purpose of automatic combustion control, governing various factors of combustion; and for many other similar things.

No. 47-2 McDonnell Combined Safety Feeders and Cut-Offs



For boilers up to 5000 square feet capacity. Maximum steam pressure, 25 pounds.

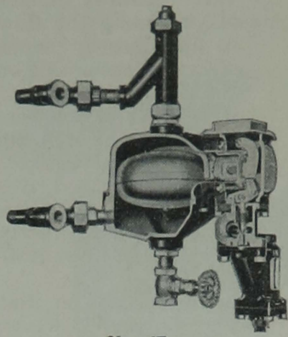
No. 47 safety feeder with No. 2 low water cut-off switch mounted in place.

For automatic jobs where completely automatic operation is desired.

Shipping weight, 31 pounds.

No. 47-2..each **$42.50**

No. 47 McDonnell Quick-Hook-Up Safety Feeders



No. 47

For hand fired boilers up to 5000 square feet capacity. Maximum steam pressure, 25 pounds.

Has a patented isolated feed valve (cool feed valve). It also has the quick-hook-up feature which cuts installation time and accurately reproduces the true boiler water level in the float chamber. Other features are stainless steel valves, double sylphon construction, straight thrust valve action, and large integral strainer.

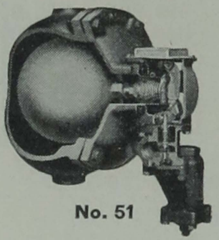
Feed water piping ½-inch. Float chamber has both quick-hook-up tappings and 1-inch tappings for installation with 1-inch equalizing pipes.

Shipping weight, 30 pounds.

No. 47..each **$36.00**

McDonnell Safety Feeders

No. 51



No. 51

For hand fired boilers above 5000 square feet capacity. Maximum steam pressure, 25 pounds.

Built for installation with 1-inch equalizing pipe hook-up and is provided with a large valve to give it added capacity for larger boilers.

Feed water piping, ¾-inch. Equalizing pipes, 1-inch.

Shipping weight, 43 pounds.

No. **51**..................each **$52.00**

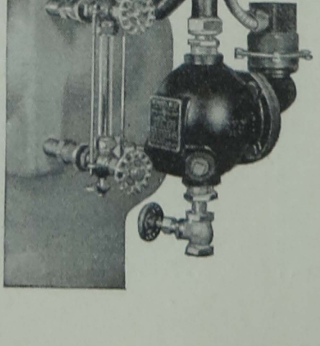
No. 53

For hand fired boilers of any size where steam pressure ranges from 25 to 75 pounds. Has the same features of design as No. 51 except that it is provided with double-ply sylphons and an extra heavy float to withstand steam pressures up to 75 pounds. Water pressure must exceed steam pressure by 10 pounds or more. Feed water piping, ¾-inch. Equalizing pipes, 1-inch.

Shipping weight, 44 pounds.

No. **53**..each **$59.00**

No. 60-B McDonnell Quick-Hook-Up Low Water Cut-Offs



For boilers with steam pressures from 15 to 25 pounds.

A combination of the No. 60-A plus the No. 159 Quick-Hook-Up Parts.

Shipping weight, 19 pounds.

No. **60**-B.......each **$23.00**

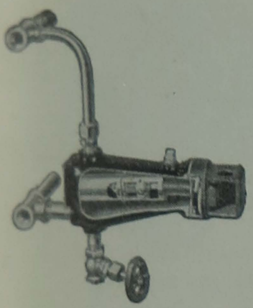
No. 159 Quick-Hook-Up Parts

For converting No. 60-A Low-Water Cut-Off into No. 60-B.

Shipping weight, 7 pounds.

No. **159**..........each **$4.50**

No. 66 McDonnell Quick-Hook-Up Low Water Cut-Offs



For boilers of any size. Maximum steam pressure, 15 pounds.

A new type small, compact, neat appearing low-water cut-off, with quick-hook-up feature for gauge-glass installation.

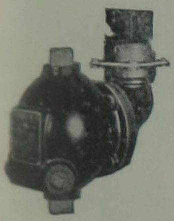
Underwriters' Laboratories approval.

A. C. ¾ h.p., 110-220 volts.
D. C. ¼ h.p., 115-230 volts.

Shipping weight, 7 pounds.

No. 66.......................................each **$20.00**

No. 60-A McDonnell Low Water Cut-Offs

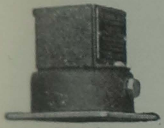


Maximum steam pressure, 25 pounds. Body tappings 1 inch top and bottom. Also tappings to take No. 159 Quick-Hook-Up Parts. A.C. ¾ h.p., 110-220 volts. D.C. 10 Amps. 125 volts.

Shipping weight, 13 pounds.

No. 60-A...................each **$18.50**

No. 2 McDonnell Low Water Cut-Off Switches



No. 2

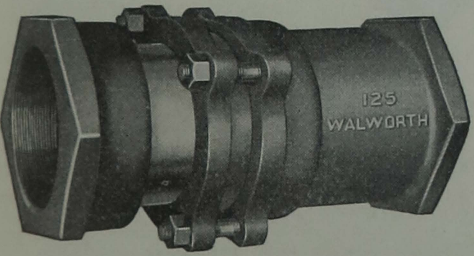
For use on Nos. 47, 51 and 53 Safety Feeders. Has high voltage cut-off contacts and low voltage alarm contacts for quick and easy application to feeders, adding low water cut-off protection to the convenience of automatic water supply. Furnished separately or mounted. Weight, 2 pounds.

No. 2, Switch Only...........................each **$6.50**

No. 1008 Walworth Expansion Joints

Iron Body, Bronze Sleeve

125 Pounds Working Steam Pressure



Standard Traverse, Screwed

Size In.	Traverse In.	End to End Open In.	Each	Size In.	Traverse In.	End to End Open In.	Each
2	2½	12⅝	$7.00	5	4	19 11/16	$38.00
2½	2½	13 15/16	8.00	6	5	22¾	45.00
3	2¾	15 3/16	10.00	8	7	28 13/16	100.00
3½	3	16⅛	14.00	10	7	30 5/16	160.00
4	3¼	17 1/16	18.00	12	8	31¾	225.00

Special traverse made to order only.

Special Traverse, Screwed

Size In.	Each Traverse, Inches *6	10	12	14	16	18
2	$11.00	$16.00	$18.50	$21.00	$23.50	$26.00
2½	13.00	19.00	22.00	25.00	28.00	31.00
3	17.50	25.00	29.00	33.00	37.00	41.00
3½	25.00	35.00	40.00	45.00	50.00	55.00
4	30.00	42.00	48.00	54.00	60.00	66.00
5	45.00	62.00	70.00	78.00	86.00	94.00
6	55.00	80.00	92.50	105.00	117.50	130.00
8	100.00	140.00	160.00	180.00	200.00	220.00
10	160.00	......	......	......	......	......
12	225.00	......	......	......	......	......

*Eastern traverse.

Moran Flexible Joints

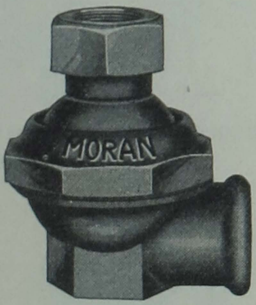
Made of cast iron. Can be furnished in bronze in all sizes at additional cost.

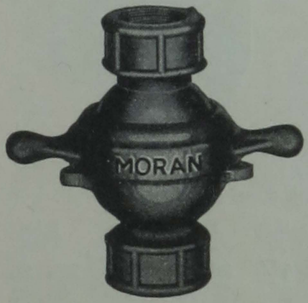
No. 1 Joints for Steam and Air

Size Inches	Each	Size Inches	Each
¼	$6.00	3	$22.50
⅜	6.00	3½	28.00
½	6.50	4	30.00
¾	7.50	4½	37.50
1	8.50	5	40.00
1¼	10.50	6	60.00
1½	12.00	8	144.00
2	15.00	10	190.00
2½	18.00	12	240.00

No. 2 Joints for Steam and Air

Size Inches	Each	Size Inches	Each
¼	$6.50	3	$24.50
⅜	6.50	3½	31.00
½	7.00	4	33.50
¾	8.00	4½	41.50
1	9.00	5	41.75
1¼	11.00	6	75.00
1½	12.50	8	165.00
2	17.50	10	250.00
2½	21.00	12	300.00

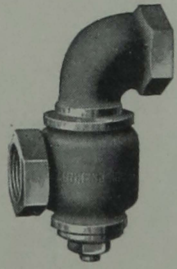




No. 3 Joints for Liquids

Size Inches	Each	Size Inches	Each
¼	$6.00	3	$22.50
⅜	6.00	3½	28.00
½	6.50	4	30.00
¾	7.50	4½	37.50
1	8.50	5	40.00
1¼	10.50	6	60.00
1½	12.00	8	144.00
2	15.00	10	190.00
2½	18.00	12	240.00

No. 614 Lunkenheimer Bronze Swing Joints



Hexagon End Pattern

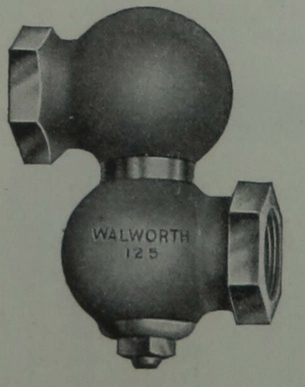
100 Lbs. G.L.P.

Inlet and outlet ends are regularly furnished threaded for same size pipe.

The flow ports are open regardless of the relative position of the inlet and outlet ends.

Size Inches	Part Finished Each	Size Inches	Part Finished Each	Size Inches	Part Finished Each
¼	$1.90	¾	$3.50	1½	$9.00
⅜	2.20	1	5.00	2	15.40
½	2.50	1¼	6.50	...	...

No. 1005 Walworth Bronze Steam Swing Joints

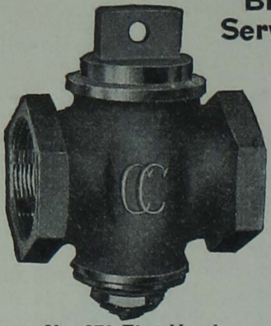


125 Lbs. Working Steam Pressure

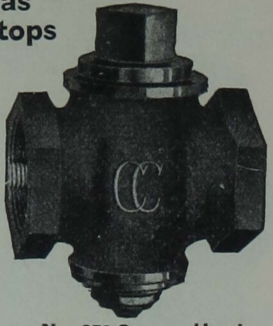
Size In.	Each
¼	$1.90
⅜	2.20
½	2.50
¾	3.50
1	5.00
1¼	6.50
1½	9.00
2	13.00

Polished steam swing joints made to order only.

Brass Gas Service Stops



No. 270 Flat Head



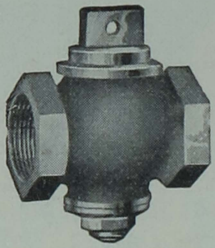
No. 272 Square Head

Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
¼	$.90	½	$1.10	1	$2.10	1½	$4.60
⅜	1.00	¾	1.30	1¼	3.25	2	8.00

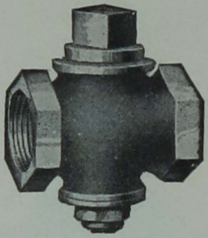
Flat head stops furnished unless otherwise ordered.

Heavy Brass Straightway Gas Service Stops

Flat and Square Head



No. 292 Flat Head



No. 294 Square Head

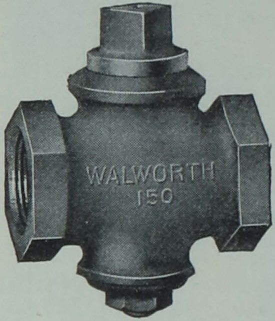
Flat head furnished, unless otherwise ordered.

Size In.	Price Each	Size In.	Price Each	Size In.	Price Each	Size In.	Price Each	Size In.	Price Each
¼	$1.10	½	$1.30	1	$3.00	1½	$6.50	2½	$24.50
⅜	1.20	¾	1.80	1¼	4.50	2	11.20	3	37.50

No. 567 Walworth Heavy Bronze Steam Cocks

Screwed Ends—Square Head

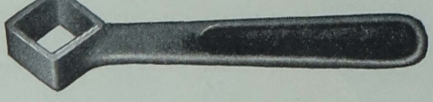
150 Lbs. Working Steam Pressure



Size Inches	Each
⅛	$.85
¼	.85
⅜	1.00
½	1.25
¾	1.70
1	2.35
1¼	3.70
1½	4.85
2	7.30
2½	14.50
3	22.50

No. 7904 Walworth Malleable Iron Cock Wrenches

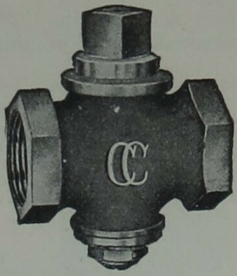
For Gas and Steam Cocks



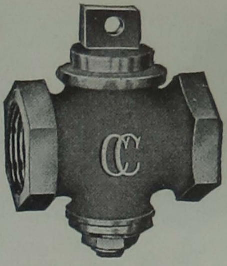
No.	Each	Size Square Opening Inches	No.	Each	Size Square Opening Inches	No.	Each	Size Square Opening Inches
1	$.05	5/16	5	$.14	11/16	8	$.44	1⅛
2	.06	⅜	5½	.17	¾	8½	.48	1 3/16
3	.07	7/16	6	.19	¾	9	.56	1¼
3½	.08	½	6½	.23	⅞	10	.56	1½
4	.09	9/16	7	.25	1	11	1.00	1¾
4½	.12	⅝	7½	.40	1 1/16	12	1.00	2

Brass Steam Cocks

For Steam Working Pressures up to 100 Pounds



No. 250 Square Head



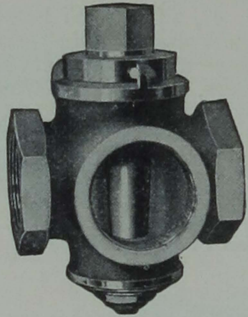
No. 252 Flat Head

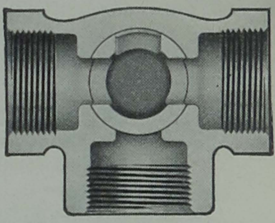
	Price, Each			Price, Each	
Size Inches	No. 250 No. 252	No. 254 with Check	Size Inches	No. 250 No. 252	No. 254 with Check
¼	$.85	....	1½	$4.85	$5.15
⅜	1.00	....	2	7.30	7.65
½	1.25	$1.40	2½	14.50	....
¾	1.70	1.90	3	22.50	....
1	2.35	2.55	...	.....	....
1¼	3.70	3.95	...	.....	....

Square head type will always be furnished unless otherwise ordered.

No. 268 Brass Three Way Steam Cocks

For Steam Working Pressure up to 100 Pounds



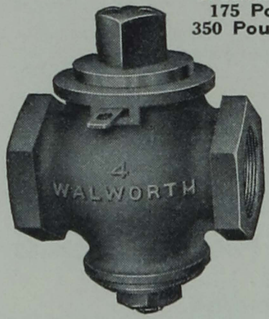


Size In.	Price Each	Size In.	Price Each	Size In.	Price Each	Size In.	Price Each
¼	$1.80	½	$2.50	1	$3.75	1½	$7.15
⅜	2.10	¾	3.00	1¼	5.75	2	11.00

Walworth Oil Country Iron Cocks

Essex Lock Pattern

Non-Shock Working Oil or Gas Pressures at Ordinary Air Temperatures
175 Pounds—Standard
350 Pounds—Extra Heavy



No. 680 Standard Pattern

The use of Walworth Essex Lock Pattern Iron Cocks is particularly advantageous on loading racks, tank cars, or oil and gas lines from the field, where it is desirable to prevent tampering with the lines. They can be locked in either open or closed positions.

Furnished in standard and extra heavy patterns, with iron nuts and bronze washers.

Prices do not include locks.

No. 680 Standard Pattern

Size	in.	2	2½	3	4
No. 680	ea.	$4.00	6.00	8.00	14.00
End to End	in.	6½	6⅞	8⅛	10
Approximate Weight	lbs.	19½	24¼	39½	68¾

No. 681 Extra Heavy Pattern

Size	in.	2	2½	3	4	6
No. 681	ea.	$5.00	7.50	10.00	17.50	55.00
End to End	in.	7¼	7½	8⅞	11⅛	13½
Approximate Weight	lbs.	29	32	52½	90	201

WALWORTH
125

Walworth Standard All-Iron Cocks

125 Pounds Working Steam Pressure
125 Pounds Working Air or Gas Pressures
150 Pounds Non-Shock Working Water or Oil Pressures at Ordinary Air Temperatures

No. 651 Square Heads
No. 656 Flat Heads

No. 651 Square Head

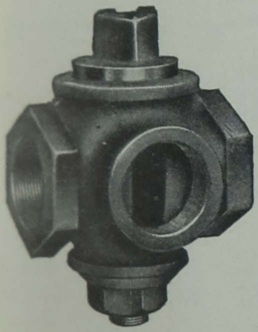
Size.........in.	⅜	½	¾	1	1¼	1½	2	2½
Nos. 651 & 656.ea.	$.85	.90	1.05	1.30	1.60	1.95	2.70	4.40

Size........in.	3	3½	4	5	6	8
Nos. 651 & 656 ....ea.	$6.75	12.00	15.50	32.00	45.00	100.00

No. 661 Walworth Standard All-Iron 3-Way Cocks

Screwed Ends—Square Head

125 Lbs. Working Steam Pressure and Air or Gas Pressures; 150 Lbs. Non-Shock Working Water or Oil Pressures at Ordinary Air Temperatures



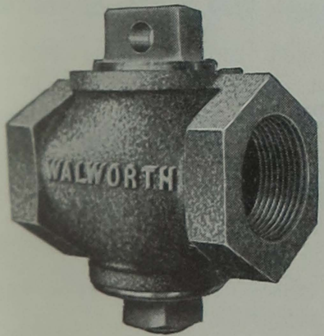
Iron cocks, when used for water or steam should have bronze plugs.

Size In.	Each	Size In.	Each
½	$1.50	3	$7.50
¾	1.65	3½	14.00
1	1.80	4	19.00
1¼	2.05	5	36.50
1½	2.65	6	52.00
2	3.65	8	110.00
2½	5.35	...	......

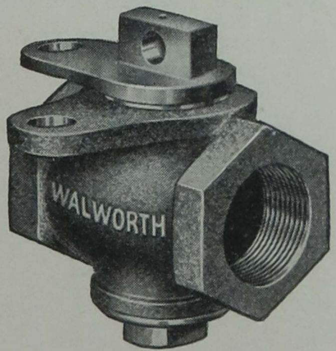
Walworth G.L.P. Iron Body Gas Cocks

Gas Line Pattern—Flat Head—Air Tested Under Water

175 Lbs. Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures



Flat Head, without Lockwing



Flat Head, with Lockwing

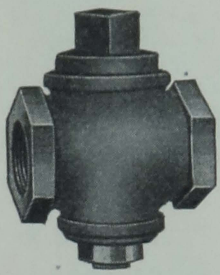
Recommended for natural gas lines, this gas cock will carry the pressures used in distributing lines, meter service lines and long distance city delivery lines. Especially recommended for heavy gas service, this cock is heavy and rugged in design. Body is of iron; plug, washer and nut are bronze. Makes straight-way connection in the line.

		Without Lockwing		With Lockwing	
Size In.	End to End, In.	No. 689 Black Each	No. 690 Galv. Each	No. 691 Black Each	No. 692 Galv. Each
½	2 13/16	$1.55	$1.65	$1.85	$1.95
¾	2 13/16	1.85	1.95	2.15	2.25
1	3¼	2.40	2.55	2.80	2.95
1¼	3¾	3.25	3.45	3.85	4.05
1½	4¼	4.95	5.20	5.70	5.95
2	5⅛	7.20	7.60	8.20	8.60

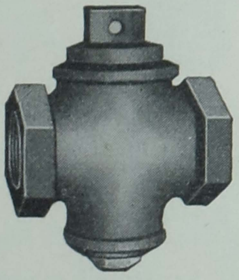
Standard Iron Cocks

Square and Flat Head

For 125 Pounds Steam Working Pressure



No. 870 Square Head
Screwed



No. 871 Flat Head
Screwed

	Screwed				Flanged		
Size Inches	All Iron Each	Galv. Each	With Brass Washer Each	With Brass Plug and Washer Each	All Iron Each	With Brass Washer Each	With Brass Plug and Washer Each
½	$.90	$1.35	$1.00	$1.40	.....	.....	......
¾	1.05	1.60	1.20	1.75	.....	.....	......
1	1.30	1.95	1.55	2.15	.....	.....	......
1¼	1.60	2.40	1.95	3.00	.....	.....	......
1½	1.95	2.95	2.35	4.15	.....	.....	......
2	2.70	4.05	3.20	5.75	$4.25	$4.75	$7.00
2½	4.40	6.60	5.15	9.50	6.25	7.00	10.50
3	6.75	10.15	7.75	14.00	9.50	10.50	15.75
4	15.50	23.25	19.00	40.00	19.00	22.50	40.00
6	45.00	67.50	.....	.....	50.00	58.00	100.00

Extra Heavy Iron Cocks

Square Head

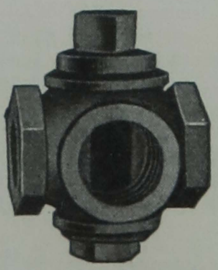
For 250 Pounds Steam Working Pressure

	Screwed, Each			
Size Inches	All Iron	With Brass Washer	With Brass Plug	With Brass Plug and Washer
½	$1.15	$1.25	$1.70	$1.80
¾	1.25	1.40	2.25	2.40
1	1.75	2.00	2.80	3.05
1¼	2.10	2.45	3.85	4.20
1½	2.80	3.20	5.60	6.00
2	3.65	4.15	7.00	7.50
2½	6.50	7.25	13.25	14.00
3	9.00	10.00	19.00	20.00
4	22.50	26.00	56.00	59.50

Standard Three-Way Iron Cocks

Square Head

For 125 Pounds Steam Working Pressure



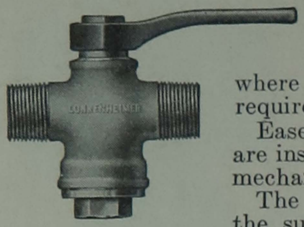
No. 872, Screwed

	Price, Screwed, Each			
Size Inches	All Iron	With Brass Washer	With Brass Plug	With Brass Plug and Washer
½	$1.50	$1.60	$1.90	$2.00
¾	1.65	1.80	2.20	2.35
1	1.80	2.05	2.40	2.65
1¼	2.05	2.40	3.10	3.45
1½	2.65	3.05	4.50	4.90
2	3.65	4.15	6.25	6.75
2½	5.35	6.10	9.75	10.50
3	7.50	8.50	13.75	14.75
3½	14.00	16.00	30.00	32.00
4	19.00	22.50	40.00	43.50
5	36.50	42.50	71.50	77.50
6	52.00	60.00	100.00	108.00
8	110.00	120.00	210.00	220.00

Prices of flanged three-way cocks upon application.

No. 1573 Lunkenheimer Bronze Mine Service Air Cocks

For 150 Pounds Pressure



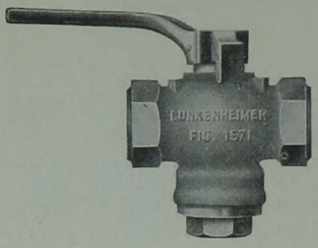
This cock is widely used as a throttle valve on pneumatic tools and also for line service where a dependable shut-off cock is required. Has stainless steel spring.

Ease of operation and a tight seat are insured by the self-adjusting spring mechanism in bottom of plug.

The strong, rigid construction and the substantial male ends make this an ideal cock to withstand the severe demands of mine service. When open, handle is at right angle with pipe; when closed, parallel. In this closed position the handle is safely out of the way.

Size Pipe Thread	inches	¾	1
Price, No. **1573**, Male Ends	each	**$8.50**	**12.00**

Lunkenheimer Bronze Air Cocks


No. 1571

Stainless Steel Spring

150 Lbs. Pressure

A packless control device easily operated. Requires no attention after installation; stays tight.

Proper seating is maintained by self-adjusting spring mechanism located at bottom of plug which automatically takes up wear, insuring tightness.

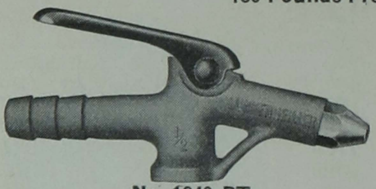
Stop lugs cast on body serve as positive stops.

Size Pipe Thread	inches	¼	⅜	½	¾
No. **1571**, Female Ends	each	**$6.25**	**$6.50**	**$7.00**	**$8.00**
No. **1572**, Male Ends	each	.....	.....	.....	**9.00**
Size Pipe Thread	inches	1	1¼	...	1½
No. **1571**, Female Ends	each	**$10.00**	**$17.00**	...	**$23.00**

Lunkenheimer Bronze Air Nozzles

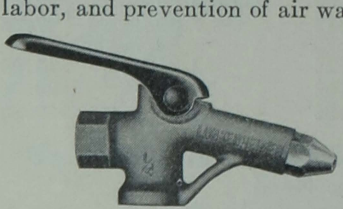
Lever Operated—Non-Metallic Disc Pointed, Flat or Extension Tip

150 Pounds Pressure



No. 1840-PT

Air nozzles are more effective and safer to use than brushes, rags, and hand bellows, for removing dust, dirt, chips, filings, borings, sand, lint, liquid deposits and other matter. First cost is earned many times in saving of time and labor, and prevention of air wastage.


No. 1841-PT

The renewable non-metallic disc insures seat tightness without the necessity of regrinding.

Unless otherwise specified, ½-inch No. 1840-PT Air Nozzle with pointed tip and integral hose end will be furnished.

Air Nozzle, Integral Hose End

Size Hose End	inches	⅜	½
No. **1840-PT**, Pointed Tip	each	**$2.50**	**$2.55**
No. **1840-ET**, Extension Tip, 10 In. Long	each	**3.60**	**3.65**
No. **1840-FT**, Flat Tip	each	**3.20**	**3.25**

Air Nozzle, Female Pipe End

Size Female Pipe End	in.	⅛	¼	⅜	½
No. **1841-PT**, Pointed Tip	ea.	**$2.00**	**$2.00**	**$2.20**	**$3.00**
No. **1841-ET**, Ext. Tip, 10 In.	ea.	**3.10**	**3.10**	**3.30**	**4.10**
No. **1841-FT**, Flat Tip	ea.	**2.70**	**2.70**	**2.90**	**3.70**

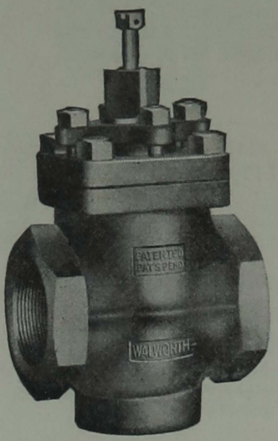
Parts

No. **1860**, Disc with Holder	ea.	**$.40**
No. **1854**, Pointed Tip, ⅛ In. Diam. Opening	ea.	**.35**
No. **1855**, Ext. Tip, 10″ Long, 5/64″ Diam. Opening	ea.	**1.25**
No. **1856**, Flat Tip, 7/16 In. by 1/32 In. Opening	ea.	**.75**

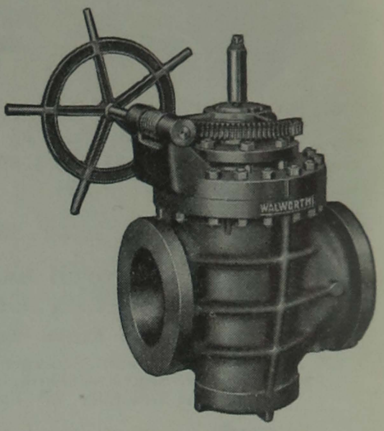
Class 250 Walworth Steeliron Straight Way Lubricated Plug Valves

Max. Working Pressure, Oil, Water, Gas at 450° F.: Screwed, 250 Pounds; Flanged, *250 Pounds

Max. Working Pressure, Oil, Water, Gas at 150° F.: Screwed, 400 Pounds; Flanged, * 400 Pounds



Screwed End Straight Way



Flanged End with Geared Operating Handle

Prices on valves do not include handles.

Flanged valves will be shipped faced only, unless otherwise specified.

For Wrench Operation

Size Inches	No. 1710 Screwed End Each	No. 1710F Flanged End Each	Size Inches	No. 1710 Screwed End Each	No. 1710F Flanged End Each
½	**$10.70**	.....	2½	**$30.00**	**$40.80**
¾	**10.70**	.....	3	**37.80**	**54.50**
1	**12.60**	**$18.20**	4	**64.50**	**81.50**
1¼	**15.40**	**23.00**	5	.....	**145.00**
1½	**16.80**	**25.00**	6	.....	**160.00**
2	**20.00**	**30.00**	8	.....	**270.00**

For Gear Handle

Size	inches	6	8	10
No. **1712F**, Flanged End, Spur Geared	each	**$220.00**	**$340.00**	**$730.00**
No. **1713F**, Flanged End, Worm Geared	each	**220.00**	**340.00**	**700.00**

Dimensions

When ordered drilled, valves will be drilled to the American Standard for 250-pound cast iron flanges. Flanged valves furnished with 1/16-inch raised face.

Size In.	End to End Scrd. In.	Face to Face Flgd. In.	Center of Port to Bottom of Body In.	Center of Port to Top of Shank In.	Diam. Flanges In.	Diam. Flange Bolt Circle In.	Flange Thickness In.	Ht. Sq. of Shank In.	Extreme Width of Body In.
½	3½	....	1 17/32	3 13/16	...	...	...	⅞	3¼
¾	3½	....	1 17/32	3 13/16	...	...	...	⅞	3¼
1	3¾	‡6¼	1¾	4 7/16	4⅞	3½	11/16	⅞	3¼
1¼	4¾	‡7	2 5/16	5 7/16	5¼	3⅞	¾	1⅛	4 3/16
1½	4¾	‡7½	2⅝	5¾	6⅛	4½	13/16	1⅛	4 3/16
2	5⅝	‡8	2 13/16	7⅛	6½	5	⅞	1⅜	4 7/16
2½	6¾	‡9	3 5/16	7 7/16	7½	5⅞	1	1⅜	5 9/16
3	7½	‡10¼	4½	9 5/16	8¼	6⅝	1⅛	1 11/16	5 27/32
4	10	‡13	5½	10 13/16	10	7⅞	1¼	2 1/16	10½
5	...	‡15¼	7⅛	12¾	11	9¼	1⅜	2⅝	...
6	...	‡16¾	7 9/16	12⅞	12½	10⅝	1 7/16	2⅝	...
8	...	‡19¾	8 13/16	17 7/16	15	13	1⅝	2⅞	...

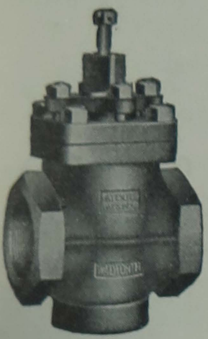
*These pressure ratings applied to American Standard Flanges with which these valves are equipped.

‡Dimension includes raised face.

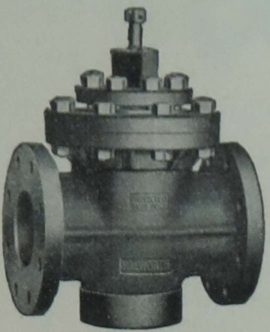
Dimensions and prices of geared valves on application.

Class 150 Walworth Bronze Lubricated Plug Valves

Bronze (85 Copper, 5 Tin, 5 Lead, 5 Zinc) or Acid Resisting Bronze (Either 88 Copper, 10 Tin, 2 Lead or 76 Copper, 10 Tin, 14 Lead)



Screwed End



Flanged End

Wrench Operated—Screwed and Flanged Ends

Straight-Way Pattern

Prices do not include handles. If handles are required they should be ordered extra.

Size Inches	No. 1736 Screwed Each	No. 1736F Flanged Each	Size Inches	No. 1736 Screwed Each	No. 1736F Flanged Each
½	$20.00	.....	2½	$88.00	$100.00
¾	20.00	.....	3	110.00	134.00
1	25.00	$36.00	4	......	182.00
1¼	34.00	.....	6	......	300.00
1½	40.00	56.00•	8	......	500.00
2	52.00	68.00	...	......	......

Worm Gear Operated—Flanged Ends

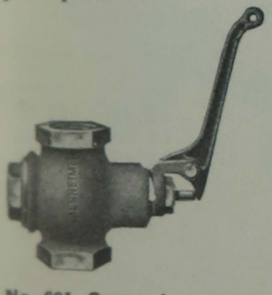
Straight-Way and Venturi Patterns

Size......inches	6	8
Worm Geared, Straight-Way Pattern.each	$405.00	$655.00
Worm Geared, Venturi Pattern.......each	315.00	530.00

Lunkenheimer Bronze Balanced Whistle Valves

200 Lbs. W.S.P.

These valves are equipped with combination adjustable lever and fulcrum allowing for vertical, horizontal or oblique pull operation.



No. 691, Screwed

Extra charge for grinding seating surfaces of valves ordered for air service.

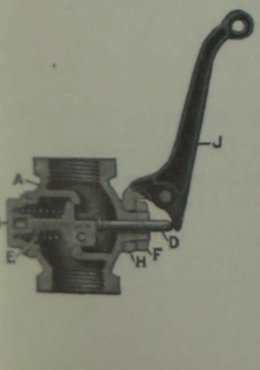
Size Inches	Price, Each No. 691 Screwed	No. 692 Flanged
1	$18.00	......
1¼	22.20	......
1½	26.60	......
2	35.50	$43.80
2½	44.40	53.20
3	62.20	77.00

No. 444 Lunkenheimer Bronze Plain Whistle Valves

Without Stuffing Box

200 Lbs. W.S.P.

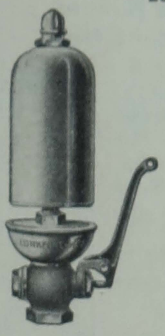
This valve is provided with lever which may be set in line with or at right angles to the valve stem. This advantageous feature in combination with the adjustable fulcrum allows installation of regular valves for vertical, horizontal, and oblique pull operation.



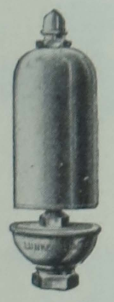
Size Inches	Price Each	Size Inches	Price Each
¼	$2.00	1	$4.40
⅜	2.00	1¼	5.60
½	2.50	1½	7.40
¾	3.00	2	14.00

Lunkenheimer Bronze Plain Whistles

200 Lbs. W. S. P.



No. 441
With Valve



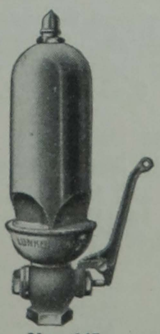
No. 442
Without Valve

Diam. Bell Inches	Pipe Thread Inches	Min. Boiler H.P.	Min Steam Working Pres., Lbs.	Price, Each No. 441 With Valve	No. 442 Without Valve
1	¼	10	10	$3.10	$2.20
1¼	¼	15	10	3.75	2.75
1½	⅜	20	10	4.00	3.00
2	½	30	12	5.50	4.35
2½	¾	45	15	7.40	5.25
3	¾	60	15	8.50	7.25
3½	1	75	20	13.00	9.50
4	1¼	100	35	16.50	12.00
5	1½	175	50	27.50	21.00
6	1½	250	70	37.50	31.00
8	2	350	90	.....	70.00
10	2½	450	120	.....	......
12	3	600	130	.....	......

Orders should indicate whether whistle is to be operated by steam or air.

Lunkenheimer Bronze Single Bell Chime Whistles

200 Lbs. W.S.P.



No. 447
with Valve

No. 448
without Valve

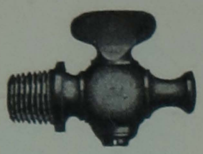
These single bell chime whistles are provided with bells especially designed to eliminate the destructive effect of the heavy vibratory strains incident to operation. Their sections are extremely heavy and the division walls of the tone compartments are cast integral with the outer shell.

An extra charge will be made for grinding the valves for air service.

Diam. Bell Inches	Pipe Thread Inches	Minimum Boiler H. P.	Minimum Steam Working Pres., Lbs.	Price, Each No. 447 with Valve	No. 448 without Valve
1½	⅜	20	12	$7.00	$5.50
2	½	30	15	10.00	8.50
2½	¾	45	20	13.00	10.50
3	¾	60	40	16.00	13.50
3½	1	75	50	22.00	18.50
4	1¼	100	60	28.00	24.00
5	1½	175	75	44.00	37.00
6	1½	250	90	60.00	49.00
8	2	350	115	.....	120.00

Air Cocks

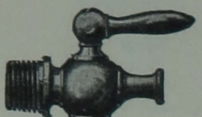
Tee Handle
Straight Nose



No.	6	7	*8	*9
Size....inches	⅛	¼	⅜	½
Each.........	$.40	.45	.50	.60
No.	*10	*63T	*64T	...
Size....inches	¾	⅛	¼	...
Each.........	$.90	.45	.50	...

*With hexagon shoulder.

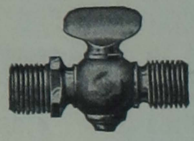
Lever Handle
Straight Nose



No.	12	13	*14	*15
Size..inches	⅛	¼	⅜	½
Each......	$.55	.60	.65	.75
No.	*16	*63L	*64L	...
Size..inches	¾	⅛	¼	...
Each......	$1.15	.60	.65	...

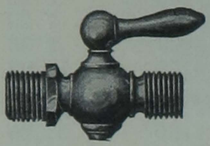
*With hexagon shoulder.

Tee Handle
Male Both Ends
With Hexagon Shoulder



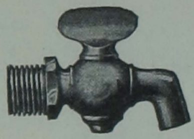
No.	18	19	20	21
Size ....inches	⅛	¼	⅜	½
Each	$.55	.65	.75	.90

Lever Handle
Male Both Ends
With Hexagon Shoulder



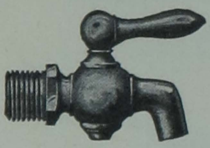
No.	22	23	24	25
Size.....inches	⅛	¼	⅜	½
Each..........	$.70	.80	.90	1.05

Tee Handle
Bibb Nose Male
With Hexagon Shoulder



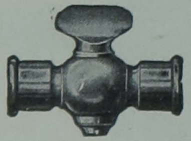
No	26	27	28	33
Size.....inches	⅛	¼	⅜	½
Each..........	$.70	.80	.90	1.00

Lever Handle
Bibb Nose Male
With Hexagon Shoulder



No.	29	30	31	32
Size....inches	⅛	¼	⅜	½
Each.........	$.85	.95	1.05	1.15

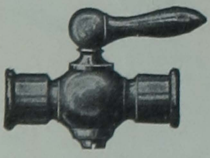
Tee Handle
Female Both Ends



No.	37	38	*38L	39	39½
Size..inches	⅛	¼	¼	⅜	½
Each.......	$.65	.70	.65	.85	1.10

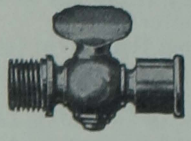
*Lightweight.

Lever Handle
Female Both Ends



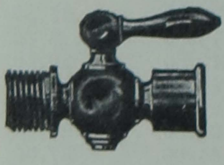
No.	43	44	45	45½
Size....inches	⅛	¼	⅜	½
Each.........	$.80	.85	1.00	1.25

Tee Handle
Male and Female Ends



No.	40	41	42	42½
Size.....inches	⅛	¼	⅜	½
Each..........	$.75	.80	.90	1.15

Lever Handle
Male and Female Ends

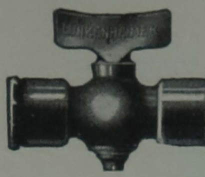


No.	46	47	48	48½
Size....inches	⅛	¼	⅜	½
Each.........	$.90	.95	1.05	1.30

Can be furnished with spring and washer at 15 cents extra.

No. 474 Bronze Steam Gauge Cocks

Tee Handle, Beaded End Pattern
Female Ends
All Finished
125 Lbs. W. S. P.

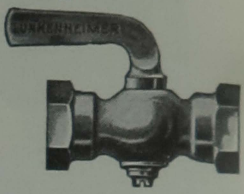


Suitable for the control of steam, air, and fluids.

Size..........inches	⅛	¼	⅜
Price, No. 474...each	$.75	.85	.95

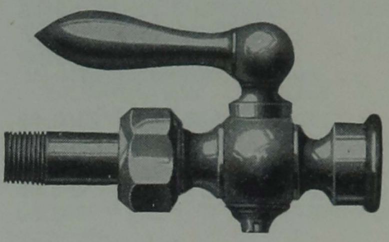
No. 1177 Bronze Steam Gauge Cocks

Lever Handle, Hexagon End
Pattern: Female Ends
All Finished
125 Lbs. W. S. P.



Suitable for the control of steam, air, and liquids.

Size....inches	⅛	¼	⅜
Price, No. 1177 ....each	$1.00	1.10	1.20



Lever Handle Gauge Cocks

With Union

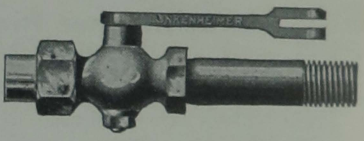
Size Inches	Light Pattern Each
⅛	$1.50
¼	1.65
⅜	....

Bronze Extra Heavy Ground Key Cocks

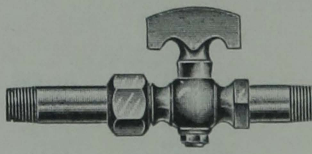
Fork Lever and Union, Long Shank
All Finished—125 Lbs. W.S.P.

All finished.

Size Inches	No. 975 Left-Hand	No. 1365 Right-Hand
⅛	$1.70	$1.70
¼	1.80	1.80
⅜	1.95	1.95
½	2.90	2.90



Cylinder Cocks with Union

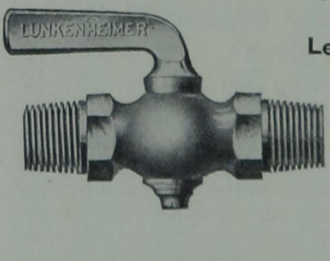


Tee Handle

No.	Size In.	Price, Each Tee Handle	 Lever Handle
97	⅛	$1.35	$1.50
98	¼	1.60	1.75
99	⅜	1.85	2.00
100	½	2.35	2.50
101	¾	2.60	2.75
102	1	3.10	3.25

No. 981 Bronze Ground Key Drain Cocks

Lever Handle Male Both Ends
125 Lbs. W.S.P.

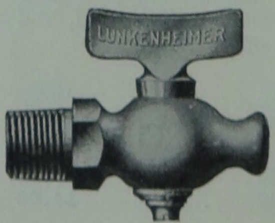


Suitable for drains or vents for apparatus using steam, air or fluids. All finished.

Size..in.	⅛	¼	⅜	½
Each...$	.65	.80	1.05	1.50

No. 476 Bronze Ground Key Drain Cocks

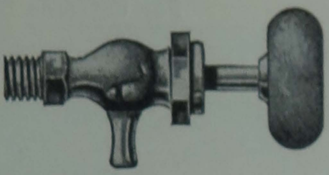
Tee Handle Male End
125 Lbs. W.S.P.



Suitable for drains or vents for apparatus using steam, air or fluids. All finished.

Size...in.	⅛	¼	⅜	½
Each......$	.45	.60	.85	1.20

Compression Gauge Cocks with Stuffing Box



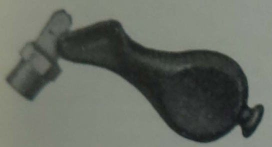
Light Pattern

Size...in.	⅜	½	¾
Each....	$1.20	1.30	1.45

Standard Pattern

Size...in.	⅜	½	¾
Each....	$1.35	1.50	1.70

Michigan Gravity Self-Closing Gauge Cocks

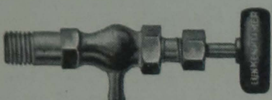


No..............	120C4	120C5
Each...........	$1.00	1.20
Pipe Thread..in.	½	¾

Lunkenheimer Bronze Gauge Cocks

Regrinding

For 250 Pounds Steam Working Pressure

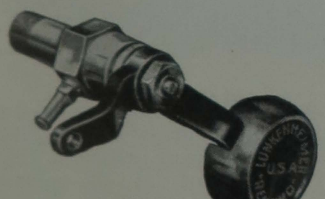


A high-grade screw spindle gauge cock of substantial and durable construction. The valve is of the regrinding pattern, facilitating repair of the seating surfaces and insuring long life and the avoidance of troublesome renewals and costly shut-downs.

Size Pipe Thread In.	Each No. 466 Composition Wheel	Each No. 1176 Iron Wheel	Size Pipe Thread In.	Each No. 466 Composition Wheel	Each No. 1176 Iron Wheel
¼	$1.15	$1.15	½	$1.30	$1.30
⅜	1.20	1.20	¾	1.80	1.80

No. 1264 Lunkenheimer Renewo Extra Heavy Bronze Weighted Gauge Cocks

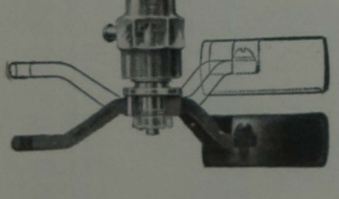
300 Lbs. W. S. P.



The seat and disc are made of rolled monel metal. The disc is provided with a slot in the exposed end, facilitating regrinding, should the seating surface become worn. The body hub and locknut are of Valve-bronze. The lever is of malleable iron, and the weight of cast iron. Every part of this gauge is renewable.

Extension chains and brass rings, S-hooks or wood handles are procurable on special order. The long shank pattern, No. 1308, measuring four inches from center of outlet nozzle to end of shank, is designed for installations in which the gauge cocks are attached directly to the boiler.

Unless otherwise specified, regular shank pattern, No. 1264, measuring 1¾ inches from center of outlet nozzle to end of shank, will be furnished.

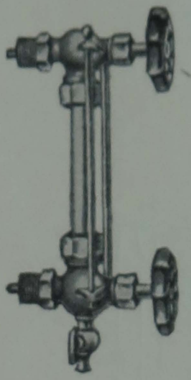


Sectional View

Price, No. **1264**. ½ or ¾-Inch Connection.......each **$5.00**
Price, No. **1308**, ¾-Inch Connection.. ....each **6.00**

Self-Cleaning Water Gauges

With Iron Wheels



Rough body; 2 guards.
Assembled with packed stems ready for use.

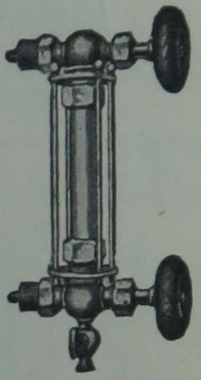
No.	Size Glass Inches	No. of Guards	Pipe Thread Inches	Price Each
000	⅝x10	2	⅜	$2.75
1	⅝x12	2	½	3.00
1½	¾x16	2	¾	4.25

Self-Cleaning Water Gauges

With Wood Wheels

Assembled with packed stems ready for use.

No.	Size Glass Inches	No. of Guards	Pipe Thread Inches	Price Each
0	⅝x10	2	⅜	$3.75
3	⅝x12	2	½	4.25
5	⅝x12	4	½	5.00
7	¾x16	4	¾	6.25
7½	¾x16	2	¾	5.50

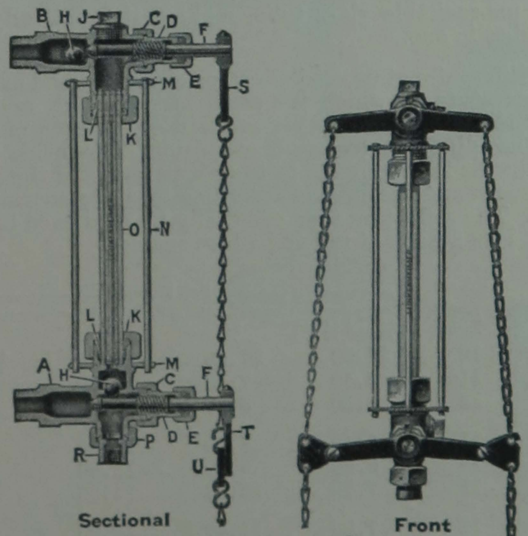


Polished Body

Lunkenheimer Bronze Water Gauges

Regrinding, Automatic

300 Lbs. W. S. P.



Sectional

Front

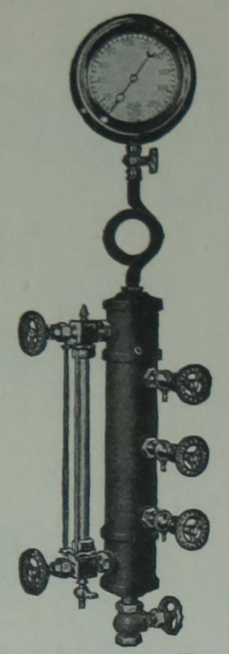
No. 1335, Cross Lever Control

In the automatic type, the inlets to the glass automatically close upon breakage of the glass. The seating surfaces of the stop valves can be reground should they become worn.

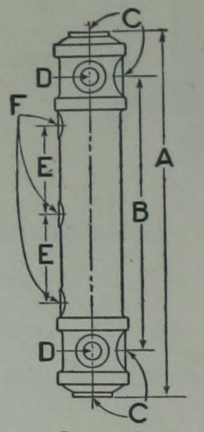
Equipped with glass and rods for centers up to 18 inches and, in the chain operated pattern, sufficient chain to properly connect the cross levers. Unless otherwise specified, gauges will be furnished with glass and rods for 18-inch centers.

Size, Pipe Connection........................	inches	½ or ¾
" Glass................................	"	¾
Price, No. **1333**, Hand Wheel Control..........	each	**$21.00**
" " **1335**, Cross Lever "	"	**23.00**

Water Columns



Body Complete with Trimmings



Dimensions

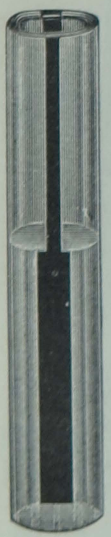
When ordered complete, trimmings for 175 pounds working pressure will be furnished, unless otherwise specified.

No.	Body Only Each	Lgth. Over All In.	Center to Center Connections, In. Boiler and Water Gauge	Center to Center Connections, In. Gauge Cock	Size Connections, In. Boiler	Size Connections, In. Water Gauge	Size Connections, In. Gauge Cock	No. Gauge Cock Tappings
1	$2.75	13⅜	10	3⅜	½	½	⅜	2
2	4.00	16¾	12½	3¾	1	½	½	3
3	6.00	18⅞	14	4½	1	¾	½	3
4	8.00	23⅝	18	4	1¼	¾	¾	3

Reflecting Sonderglass Gauge Glasses

In Sonderglass an improvement has been made, by fusing two separate semi-metallic substances into one strong and almost unbreakable glass tube, making it practically two glass tubes in one.

The different metals used allow for expansion and changes of temperature to which the glass is subjected, and add greatly to its pressure-resisting qualities, as each of these metals has different degrees of expansion. The inside of the tube expands in proportion to the temperature of the steam or hot water and the outside according to the temperature of the air. The reflecting type can easily be read even in dark places. Has a back of red and white enamel.



Length Inches	Per Dozen — Diameter, Inches ½ and ⅝	¾	⅞	1
10	$5.00	$7.00	$8.00	$10.40
11	5.40	7.40	8.60	11.20
12	6.00	8.40	10.00	12.40
13	6.40	9.00	10.60	13.60
14	6.60	9.60	11.00	14.80
15	7.00	10.00	11.80	15.60
16	7.80	11.40	12.60	17.00
17	8.00	11.80	13.40	18.00
18	8.60	12.20	14.20	19.00
19	9.00	13.00	15.00	20.00
20	10.00	14.00	16.40	21.40
22	11.00	14.80	17.20	22.40
24	12.00	16.80	20.00	24.80
30	14.00	20.00	23.40	31.20
36	17.20	24.40	28.40	38.00
48	23.40	34.20	37.80	51.00
60	28.00	40.00	47.20	62.40
72	34.40	48.80	56.80	76.00

Sonderglass High Pressure Gauge Glass

For Extreme Steam Pressures

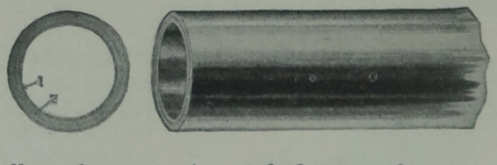
SONDERGLASS

Until the advent of the Sonderglass Brand of Gauge Glass there had been no improvement in gauge glasses for more than forty years. Scotch glasses are of exactly the same quality of material that they were forty years ago. They are made simply from scrap plate glass containing more or less air bubbles which, when the metal is drawn into tubes, elongate and show the straight specks or cracks always found in Scotch gauge glasses. These weaken the tubes, and the steam striking the end of the glass breaks away the portions where these cracks occur, so that the end of the glass will often be found extremely thin, showing that the whole strength of the Scotch glass lies on the thin inner skin of the tube.

By the use of this High Pressure Glass the element of safety is greatly increased, while the expense of gauge glasses, even in view of their first cost, is really decreased on account of their durability. It is not claimed that Sonderglass Gauge Glass will not break sometime, but it is a fact that it will resist high pressures and changes of temperature from sudden drafts of air, or from contact with cold liquids, be more satisfactory, cheaper and very much safer than the Scotch glass, and it brings the gauge glass, now the weakest point in the steam system, up to the standard of the modern steam plant.

The improvement made in Sonderglass is in the use of a very much better material, and the fusing of two separate metals into one strong tube.

Two Glass Tubes in One



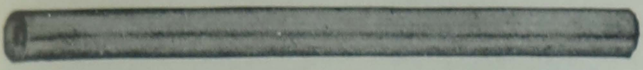
This allows for expansion and changes of temperature to which the glass is subjected, and adds greatly to its pressure-resisting qualities as each of these skins or tubes has different degrees of expansibility. The inside of the tube expands in proportion to the temperature of the steam or hot water, and the outside according to the temperature of the air.

Sonderglass remains clear and does not become cloudy or obscured, as does the Scotch glass, and is not affected by alkali or acid.

Length Inches	Price, per Dozen — Size, Inches ½ and ⅝	¾	⅞	1
10	$5.00	$7.00	$8.00	$10.40
11	5.40	7.40	8.60	11.20
12	6.00	8.40	10.00	12.40
13	6.40	9.00	10.60	13.60
14	6.60	9.60	11.00	14.80
15	7.00	10.00	11.80	15.60
16	7.80	11.40	12.60	17.00
17	8.00	11.80	13.40	18.00
18	8.60	12.20	14.20	19.00
19	9.00	13.00	15.00	20.00
20	10.00	14.00	16.40	21.40
22	11.00	14.80	17.20	22.40
24	12.00	16.80	20.00	24.80
30	14.00	20.00	23.40	31.20
36	17.20	24.40	28.40	38.00
48	23.40	34.20	37.80	51.00
60	28.00	40.00	47.20	62.40
72	34.40	48.80	56.80	76.00

Standard Gauge Glasses

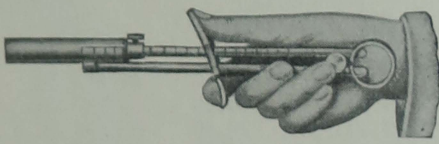
For 150 Pounds Steam Working Pressure



Lgth. In.	Per Dozen — External Diam., In. ½	⅝	¾	⅞
10	$2.28	$3.00	$3.60	$5.04
11	2.64	3.24	3.96	5.64
12	2.76	3.60	4.32	6.12
13	3.00	3.84	4.80	6.60
14	3.24	4.20	5.16	7.08
15	3.48	4.44	5.52	7.56
16	3.72	4.80	5.88	8.16
17	3.96	5.04	6.24	8.64
18	4.20	5.40	6.60	9.12
19	$4.44	$5.64	$7.08	$9.60
20	4.68	6.00	7.44	10.20
22	5.04	6.60	8.16	11.16
24	5.52	7.20	8.88	12.12
30	6.96	9.00	11.16	15.24
36	8.28	10.80	13.44	18.24
48	11.04	14.52	18.00	24.36
60	13.80	18.12	22.56	30.48
72	16.56	21.84	27.12	36.48

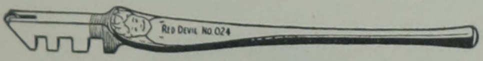
Lengths not regular charged the price of next longer tubes of same diameter. Prices on larger sizes upon application.

Chesterton Gauge Glass Cutters



Nickel-Plated Glass Cutters....................each **$2.00**
Ex. cutter wheels $2.20 per doz.; ex. pins 20c per doz.

No. 024 Red Devil Glass Cutters

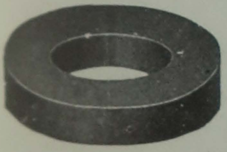


Wheels are made by precision machines, which shape the edges under pressure before being ground and honed. Cutter is pre-greased.

Packed one in a box; 12 in a carton; 5 gross in a case.

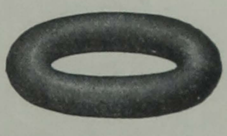
No. **024**....................................per dozen **$3.00**

Rubber Gauge Glass Washers



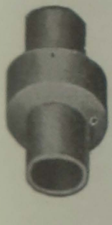
No. 2011, Square

Size In.	Per Doz. Square	Round
½	$.36	$.48
⅝	.36	.54
¾	.36	.60



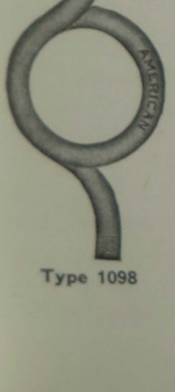
No. 689, Round

Gilbert's Self-Packing Gauge Glass Preservers



No.	1	2	3	4	5	6	7
Per Box	$.60	.60	.60	.60	.60	.60	.60
Size, in.	½	⅝	¾	1–1¼	⅝	¾	¾
Cushion:							
Depth, in.	¼	¼	⅜	½	5/16	¼	⅜
Width, in.	⅛	⅛	⅛	¼	5/16	¼	3/16
No. in Box	12	12	12	6	9	9	8

American Ashcroft Steam Gauge Siphons



Type 1098

Connection, ¼ inch.

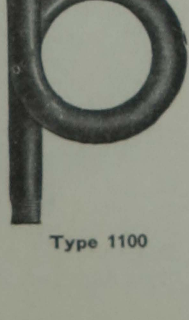
Brass siphons are good for 250 pounds; iron, for 500 pounds.

Type 1098 Coil Pipe

Iron..........ea.	$.25
Brass.........ea.	1.00
N.P. Dip.....ea.	1.50
Chromium Dip ....ea.	1.75

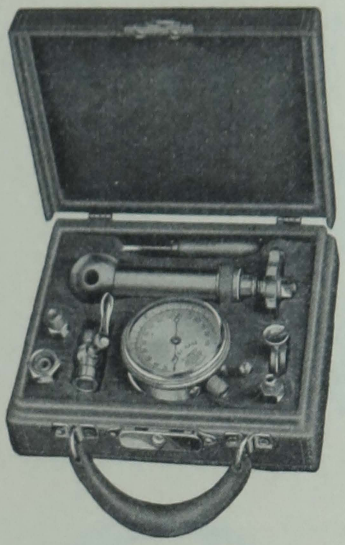
Type 1100 Pig Tail

Iron..........ea.	$.20
Brass.........ea.	.75
N.P. Dip.....ea.	1.25
Chromium Dip ....ea.	1.50



Type 1100

Style CE Crosby Inspectors' Test Pumps

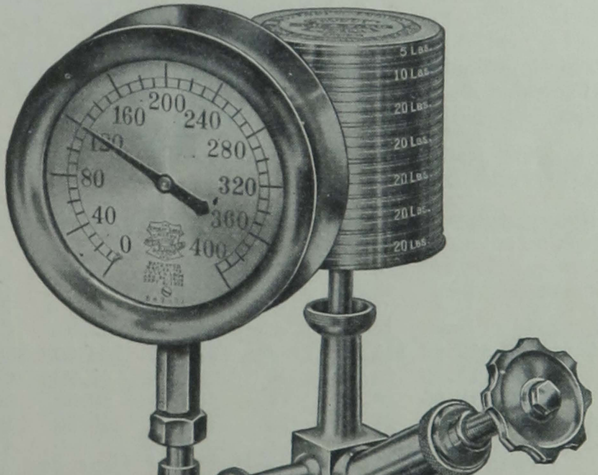


This test pump has a 3-inch nickel plated bev. glass standard test gage and appliances and is furnished in a velvet lined leather case.

Weight, 6¼ pounds.

Style CE..each **$55.00**

Style CC Crosby Dead Weight Testers



Affords an exact means of checking the accuracy of pressure gages. Consists of a stand from which rises a cylinder having accurately fitted into it a piston of 1/5 square inch area which moves freely up and down. Attached to top of piston rod is a tray for supporting weights. Each weight is marked with the number of pounds per square inch it will exert on gage. Pressure is controlled by a screw plunger operating in an oil reservoir which is attached to bottom of cylinder from which also extends a gage connection.

Detailed instructions accompany every instrument.

Tester is furnished in a mahogany case with the necessary tools and 5 hexagon bushings to fit various gage connections.

Brass weights for testing up to 300 pounds are packed in a separate wooden case with handle. Additional separate iron weights in units to give 100 pounds each are furnished for higher pressures.

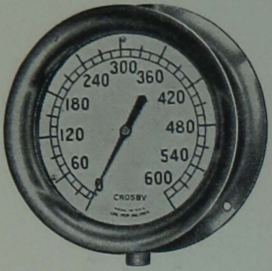
Gage is not furnished with tester.

With Weights for Testing to 200 Lbs..........each	**$125.00**
With Weights for Testing to 300 Lbs..........each	**135.00**
With Weights for Testing to 500 Lbs..........each	**150.00**
With Weights for Testing to 800 Lbs..........each	**180.00**
With Weights for Testing to 1000 Lbs.........each	**200.00**

Style AA Crosby Pressure Gauges

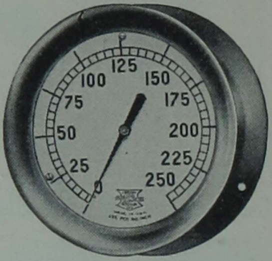
A single bronze tube pressure gauge for indicating pressures from 15 to 600 pounds.

Standard graduations are 15, 30, 60, 100, 160, 200, 250, 300, 400, 500, and 600 pounds.



Size In.	Iron Case Each	Brass Case Each	N.P. Case Each
2½	.....	$4.50	$4.70
3	.....	8.50	9.50
3½	$7.00	9.00	9.75
4½	8.00	10.00	11.00
5	8.00	11.00	12.00
6	13.00	16.00	17.50
6¾	16.00	20.00	22.00
8½	22.00	30.00	32.50
10	32.00	40.00	43.00
12	50.00	75.00	79.00
16	90.00	125.00	135.00

Style AR Crosby Pressure Gages



This is a double tube gauge, with the tubes lathe turned and screwed into the socket on all gauges 6 inches and over in size. Pressures 100 to 1500 pounds.

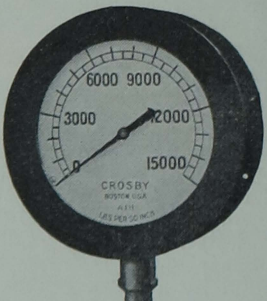
Standard graduations 100, 160, 200, 250, 300, 400, 500, 600, 800, 1000 and 1500 pounds.

Heavy tubes; minimum hand vibration; self-draining tubes; no solder to melt out.

Size In.	Iron Case Each	Brass Case Each	N. P. Case Each	Size In.	Iron Case Each	Brass Case Each	N. P. Case Each
4½	$10.00	$12.00	$13.00	8½	$25.00	$34.00	$36.50
5	11.00	13.00	14.00	10	37.00	45.00	48.00
6	15.00	18.00	19.50	12	55.00	80.00	84.00
6¾	18.00	22.00	24.00	16	105.00	140.00	150.00

Style AIH Crosby All-Steel Gauges

Stainless Steel Trim



Iron case, black finished flat screwed ring, forged steel socket, single steel tube. Dust and moisture proof. Forged steel sector and pinion.

Drawn alloy steel tube with welded connections for graduations below 100 pounds. Tubes turned and bored from forged alloy steel billet, and with threaded connections, for graduations 100 pounds and above.

Standard graduations:

Pressure—4½ and 5-inch sizes, 0 to 15, 30, 60, 100, 160, 200, 250, 300, 400, 500, 600, 800, 1000, 1500, 2000, 3000, 5000, 8000 and 10000 pounds; 6 to 12-inch sizes, all of the above pressures and also 0 to 15000 pounds.

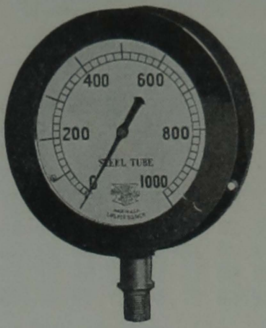
Compound—All sizes, all the pressures listed up to and including 600 pounds, with 30-inch (mercury) vacuum.

Vacuum—4½ and 5-inch sizes not furnished; 6 to 12-inch sizes, 0 to 30-inch (mercury) vacuum.

Size.........in.	4½	5	6	8½	10	12
Graduations Below 100 Lbs.ea.	$30.40	$33.20	$36.80	$60.00	$74.40	$90.40
Graduations 100-Lbs. & Above....ea.	30.40	35.60	40.80	73.60	90.40	102.40

Style AIO Crosby All-Steel Gauges

Stainless Steel Trim



Iron case, black finished flat ring, forged steel socket. Single steel tube. Forged steel sector and pinion.

Standard graduations:

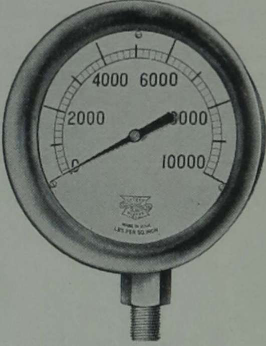
Pressures—0 to 15, 30, 60, 100, 160, 200, 250, 300, 400, 500, 600, 800 and 1000 pounds.

Compound—All of the above pressures up to and including 600 pounds, with 30-inch (mercury) vacuum.

Vacuum—4½ and 5-inch sizes not furnished; 6 to 12-inch sizes, 0 to 30-inch (mercury) vacuum.

Size Inches	Graduations Below 100 Lbs. Slip Ring Each	Graduations Below 100 Lbs. Screwed Ring Each	Graduations 100 Lbs. and Above Slip Ring Each	Graduations 100 Lbs. and Above Screwed Ring Each
4½	$27.20	$30.40	$23.20	$26.40
5	29.60	33.20	25.60	29.20
6	32.80	36.80	28.80	32.80
8½	55.20	60.00	51.20	56.00
10	68.00	74.40	64.00	70.40
12	84.00	90.40	80.00	86.40

Style AH Crosby Hydraulic Gages



Single steel tube with screwed ends, tubes bored and turned from solid bar of forged alloy steel and especially heat treated.

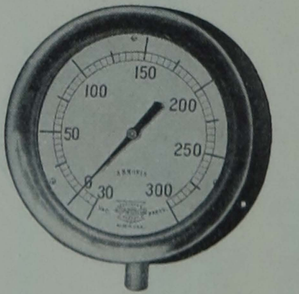
Standard graduations are 1000, 1500, 2000, 3000, 5000, 8000, 10000, 15000, 20000 and 25000 pounds.

4½ and 5-inch gauges to 10000 pounds only.

Size In.	Iron Case Each	Brass Case Each	N. P. Case Each	Size In.	Iron Case Each	Brass Case Each	N. P. Case Each
4½	$25.00	$30.00	$31.00	8½	$70.00	$80.00	$82.50
5	30.00	35.00	36.25	10	90.00	100.00	103.00
6	35.00	40.00	41.50	12	110.00	125.00	129.00
6¾	50.00	60.00	62.00	....	......	......	......

Style AIA Crosby Gauges

For Ammonia, Etc.



Iron case, nickel-plated slip ring. Steel tube with nickel-plated bronze movement and malleable iron socket.

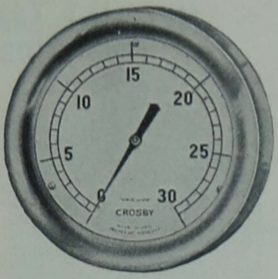
Standard graduations:

Pressure—0 to 15, 30, 60, 100, 160, 200, 250, 300, 400, 500, 600 pounds.

Compound—30 inches vacuum, and any pressure listed above.

Size..........	4½	5	6	6¾	8½	10	12
Style AIA..ea.	$17.38	20.84	24.48	27.96	40.00	52.00	75.00

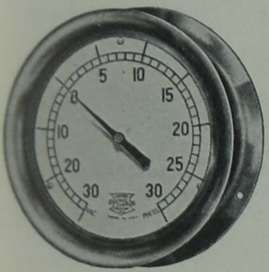
Style AB Crosby Vacuum Gages



Graduated to 30 inch mercury.

Size In.	Iron Case Each	Brass Case Each	N. P. Case Each	Size In.	Iron Case Each	Brass Case Each	N. P. Case Each
3	.....	$8.50	$9.50	6¾	$16.00	$20.00	$22.00
3½	$7.00	9.00	9.75	8½	22.00	30.00	32.50
4½	8.00	10.00	11.00	10	32.00	40.00	43.00
5	8.00	11.00	12.00	12	50.00	75.00	79.00
6	13.00	16.00	17.50	16	90.00	125.00	135.00

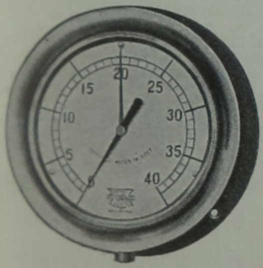
Style AAX Crosby Compound Pressure and Vacuum Gages



Standard graduations are 15, 30, 60, 100, 160, 200, 250, 300, 400, 500 and 600 pounds, all with 30 inch vacuum.

Size In.	Iron Case Each	Brass Case Each	N.P. Case Each	Size In.	Iron Case Each	Brass Case Each	N.P. Case Each
3	.....	$10.20	$10.60	6¾	$20.00	$25.00	$27.00
3½	$10.00	12.00	12.75	8½	30.00	40.00	42.50
4½	12.00	14.00	15.00	10	40.00	50.00	53.00
5	14.00	16.00	17.25	12	60.00	80.00	84.00
6	16.00	20.00	21.50	16	100.00	130.00	140.00

Style AJ Crosby Altitude Gauges

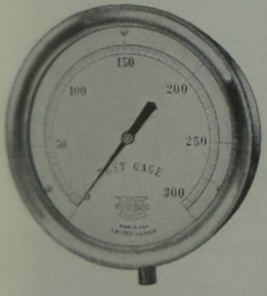


This is a single bronze tube gauge for indicating altitudes.

Standard graduation 0 to 30, 40, 60, 70, 100, 160, 200, 250, 300, 400, 500 and 600 feet of water.

Size In.	Iron Case Each	Brass Case Each	N.P. Case Each	Size In.	Iron Case Each	Brass Case Each	N.P. Case Each
3½	$10.00	$12.00	$12.75	8½	$30.00	$40.00	$42.50
4½	12.00	14.00	15.00	10	40.00	50.00	53.00
5	14.00	16.00	17.25	12	60.00	80.00	84.00
6	16.00	20.00	21.50	16	100.00	130.00	140.00
6¾	20.00	25.00	27.00	..	......	......	......

Style AC Crosby Test Gages

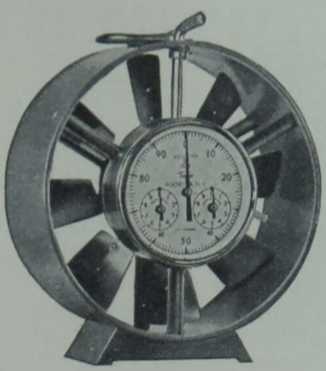


Dial specially graduated for accurate test purposes. Standard graduations: 0 to 15, 30, 60, 100, 200, 300, 400, 500, 600, 800, 1000 lbs., or 30-inch vacuum (mercury).

Also single steel tube, Style ACH to 10000 pounds. Prices upon application.

Size Inches	Each		Size Inches	Each	
	Brass Case	N.P. Case		Brass Case	N.P. Case
3	$14.00	$14.60	6¾	$30.00	$32.00
3½	14.00	14.75	8½	40.00	42.50
4½	16.00	17.00	10	50.00	53.00
5	20.00	21.25	12	60.00	65.00
6	25.00	26.50	....	.....	.....

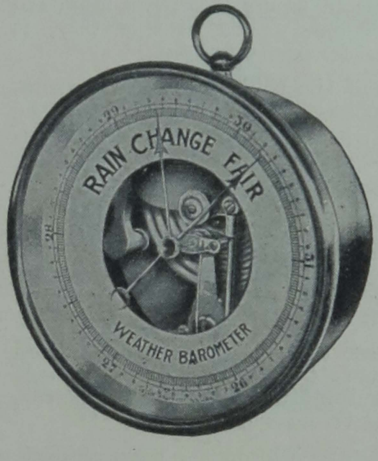
No. 3132 Taylor Jeweled Anemometers



For measuring velocity of currents of air in mines, tunnels, airways, etc. Will measure from 200 to 3000 feet per minute. Should be placed in air channel, all hands having been set at zero. Stop lever can then be moved, and instrument will start registering. At end of test period move stop lever and note reading. Has instantaneous zero-setting device (no key required); jeweled bearing; calibration chart; diameter 4 inches; 3 dials reading to 10000 feet.

No. **3132** in Cardboard Carrying Case.........each **$40.00**

No. 2202 Taylor Aneroid Barometers



Has a lacquered brass case, 5 inches in diameter; white-enameled open center dial.

Good grade movement.

Also available, at no extra cost, for medical and scientific use, with dial engraved to give metric measurements, in addition to ordinary inch scale, but without weather words.

In card box.

No. **2202-5** In.ea. **$13.50**

No. 6180 Taylor Mercurial Barometers

This is an observatory-type mercurial barometer for use in laboratory, observatory, school and home.

Black-oxidized frame is 39 inches long. Fortin-type improved cistern; silvered scales with black-filled figures, protected by glass cover.

Range of scale, 26 to 31 inches; inch-and-metric scale with double vernier reading to 0.01 inch and 0.1 mm.

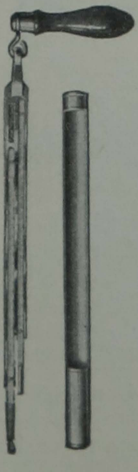
No. **6180**..............................each **$150.00**

No. 6180A, for High Altitudes

Same as No. 6180 except for altitudes up to 5000 feet. Scale range, 23.5 to 32.5 inches and 595 to 825 mm.

No. **6180A**...........................each **$157.00**

No. 1321 Taylor Sling Psychrometers



United States Weather Bureau Type

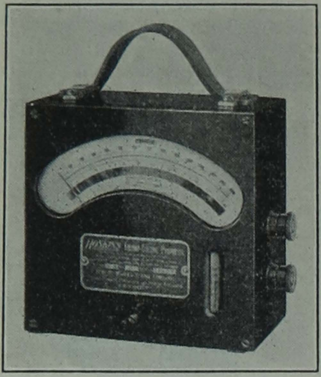
Affords free circulation of air to thermometer bulbs. Generally accepted as the standard method of checking humidity.

With 12-inch engraved thermometers, graduated 30 to 200 degrees F. in 1-degree divisions.

Complete with copper case to protect thermometer tubes when not in use.

No. **1321**, Complete	each	**$8.63**
No. **1321A**, Extra Engraved Thermometer for No. 1321	each	**3.00**
Wicks	per dozen	**.75**

Hoskins Portable Pyrometers



Type HA

Case is made of aluminum and has a bright black enamel finish.

Approximate over all size, 6¼x6x3 inches.

Type HA

A high resistance portable meter, especially handy for check purposes. Not adapted to work where it will get rough usage.

Whether the pyrometer installation is large or small, the user should have some means of checking its accuracy. This is best done by means of the Type HA meter shown in the illustration, equipped with a standard lead and high resistance couple. Used in this way, it should be employed for no other purpose.

So that the temperature of the cold-end of the thermocouple may be known, the cold-end being at the meter, the instrument is equipped with a small thermometer. The cold-end setting of the needle is then made accordingly by turning the screw beneath the name plate.

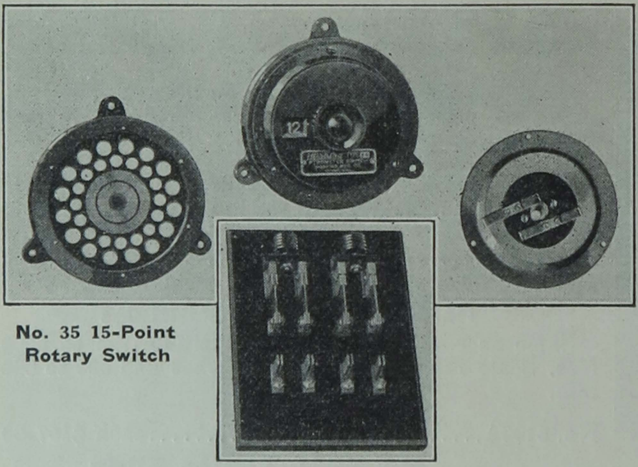
Type PA

A low resistance meter which fills the need for a rugged portable instrument for miscellaneous work. Accurate and sufficiently rugged to withstand the rough treatment it may be given by an unskilled workman.

In ordering either of these meters, specify the desired length of couple and leads and state whether the instrument is to be equipped with the automatic cold-end compensator, for which there is a small extra charge.

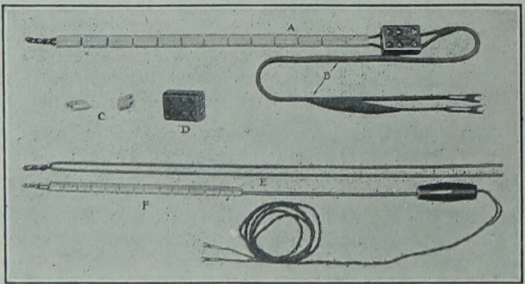
Prices, complete catalogue and information upon request.

Accessories for Hoskins Pyrometers



No. 35 15-Point Rotary Switch

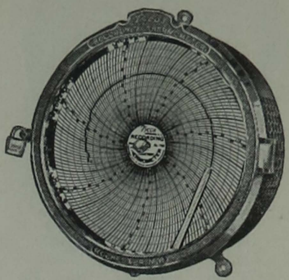
No. 36 4-Point Double Pole, Double Throw



A—High Resistance Couple
B—Extension Lead Wire
C—Porcelain Insulators
D—Connector Block
E—Bare Thermo-Couple
F—Low Resistance Couple

Prices, complete catalogue and information upon request.

No. 3JL1 Taylor Self-Contained Recording Thermometers



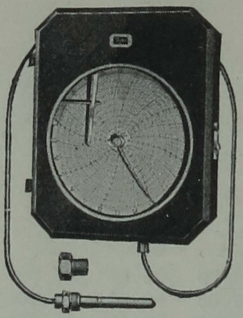
Approximately 11 inches in diameter; of sturdy and practicable construction. Body of case is white enameled, while solid bronze hinged front is highly polished nickel plate finish.

Suitable for recording temperatures within limits of 40° F. below zero and 150° F. above, or equivalent centigrade as in factories, green-houses, etc. and for out-of-doors provided instrument is located on porch or in other sheltered place where it will be protected from elements.

No. **3JL1** with 24-Hour Clock	each	**$55.00**
No. **3JL1** with 7-Day or 48-Hour Clock	each	**59.00**

No. 68J Taylor Recording Thermometers

For Face-Mounting, with 1 Pen



For applications where a pressure-tight connection is required and where circulation about bulb is good.

If circulation around standard bulb is poor, the length of bulb stem may be increased to extend bulb properly.

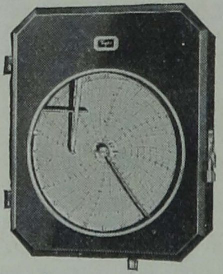
Union-connection bulb has ¾-inch threaded hub.

Standard bulb materials: No. 68JM123, steel bulb copper-plated and then nickel-plated; No. 68JV123, and No. 68JG123, copper to 500° F., steel above 500° F.

Optional bulb materials: No. 68JM123, 18-8 stainless steel extra cost; No. 68JV123, steel bulb to 500° F., at no extra cost, and stainless steel or monel bulb to or above 500° F. at extra cost; No. 68JG123, steel bulb to 500° F. at no extra cost, and stainless steel bulb to or above 500° at extra cost.

No.	**68JM123**	**68JV123**	**68JG123**
Type Actuating Medium	Mercury	Vapor	Gas
Each	**$72.00**	**$64.50**	**$69.50**
Extra for Stainless-Steel or Monel Union-Connection Assemblies and Bulbs, Where Options Permit each	**9.25**	**5.50**	**13.00**

No. 68JF Taylor Face-Mounting Recording Gauges



A one-pen pressure gauge which records pressure at one point. Furnished with 10-inch chart. Bottom connected.

Pressure scale of chart is 3½ inches wide.

Standard finish of rectangular case is dull instrument-black enamel. White-finish case available at no extra cost.

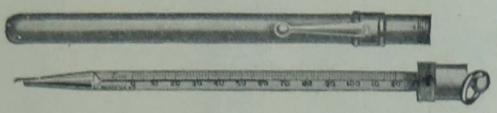
Regular equipment includes spring-driven 24-hour clock, supply of ink, 100 charts, and brass spring. An extra charge will be made for other than 12 or 24-hour spring-driven clocks, for electric-driven clocks and for alloy-steel springs.

When ordering, give number of gauge, operating range, application and spring material.

When instrument is to record pressure of corrosive fluids, an oil seal must be used to protect pressure spring of gauge.

No. **68JF135**, 10 to 600 Lbs.	each	**$45.00**
No. **68JF135**, 601 to 1000 Lbs.	each	**50.00**
No. **68JF135**, 1001 to 2000 Lbs.	each	**55.00**
No. **68JF135**, 2001 to 4000 Lbs.	each	**60.00**
No. **68JF135**, 4001 Lbs. and Over	each	**70.00**

No. 21870 Taylor Etched-Stem Pocket Thermometers



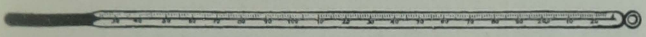
This thermometer is constructed with strong pointed glass bulb, to facilitate insertion in meats, fruits and vegetables, to determine temperatures during transit or in storage.

Pocket case provides protection when not in use.

Range, 0 to 120 degrees F. 1 degree divisions. Length, 6 inches.

No. **21870**..each **$2.18**

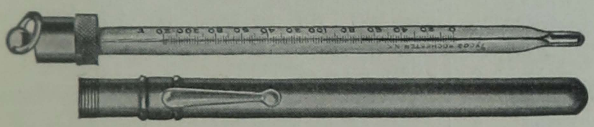
Taylor Etched-Stem Thermometers
In Turned Wood Carrying Cases



All these thermometers are for full immersion, except No. 21242 which is for 3-inch immersion.

No.	Each	Approximate Range	Divisions	Length Inches
21230	**$1.80**	−40° to +120° F.	1°	12
21232	**1.80**	0° to 220° F.	2°	12
21234	**1.80**	30° to 300° F.	2°	12
21236	**2.30**	30° to 400° F.	2°	14
21238	**3.77**	30° to 600° F.	2°	16
21240	**3.20**	30° to 750° F.	2°	16
21242	**5.25**	100° to 950° F.	5°	16

In Pocket Carrying Case



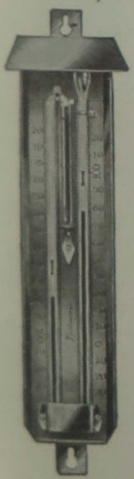
21410	***$1.20**	−30° to +120° F.	2°	5½
21412	**†1.20**	−30° to +120° F.	2°	5½
21418	***1.50**	0° to 220° F.	2°	5½

*Mercury filled. †Red-liquid filled.

Taylor Dairy Thermometers

Range, 30 to 220 degrees F., ordinary grade.
Length, 8 inches.
Packed in individual boxes, 12 in a carton.

No. **5715M**, Tube Filled with Mercury.......per doz. **$7.50**
No. **5715S**, Tube Filled with Red Liquid.....per doz. **7.50**



No. 5452 Taylor Six's—Pattern Maximum and Minimum Registering Thermometers

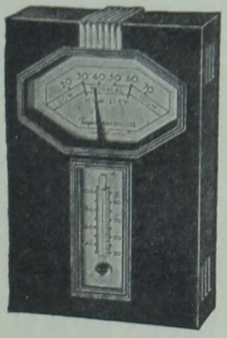
Scale and case one-piece lacquered brass Outdoor range.

Length 10 inches.

Packed 1 in a box, with setting magnet.

No. **5452**....................per dozen **$84.00**

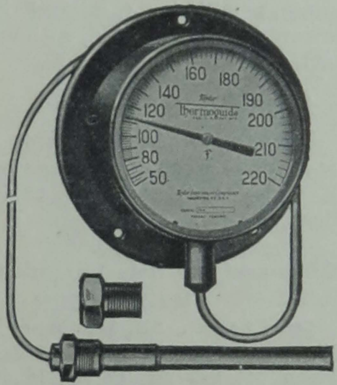
No. 5538 Taylor Hampton Model Humidiguides



Satin black case with chrome reed trim.

No. **5533**, with Indoor Thermometer............each **$3.50**

No. 14KV123 Taylor Thermoguides



Vapor actuated. Pressed metal case. Base diameter, 6½ inches. Dial, 5 inches, with ¾ circle scale; large figures and graduations.

Copper union-connection bulb with ¾-inch threaded hub. Steel, stainless steel or monel bulbs optional. No extra charge for steel; monel or 18-8 stainless steel, $5.50 extra.

Standard ranges: Minus 40 to plus 120° F.; 0 to 160° F.; 100 to 290° F.; 300 to 530° F.; 50 to 220° F.; 150 to 370° F; 10 to 105°C.

With 5 feet 3/16-inch heavy copper tubing.

No. **14KV123**, Bottom Connected ....each **$17.50**

Taylor Cup-Case Thermometers

Specially suited to taking temperature of liquids in tanks.

At the bottom of the thermometer case is a cup in which a small quantity of the liquid is retained around the bulb, preventing loss of heat, thus allowing sufficient time to obtain a reading after thermometer is withdrawn from the tank.

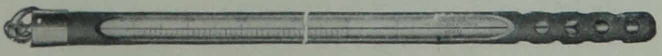
Glass tubes are filled with non-fading easy-reading red liquid.

Scale divisions are 2 degrees. Scale length, 10 inches.

Case is of wood, with brass cup.

No.	Approx. Range Degrees F. Minimum	Approx. Range Degrees F. Maximum	Each
1796S	20 to 0	150 to 170	**$18.00**
1796SA	20	220	**18.00**

No. 21274 Taylor Etched-Stem Armored Thermometers



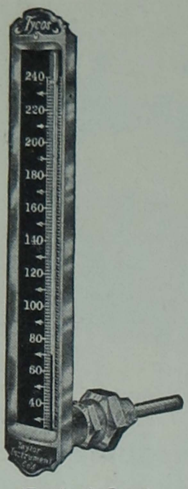
This thermometer is provided with protective armor and is designed primarily for general test work within its range limitations.

Calibrated for use under 3-inch immersion conditions, making a temperature reading possible without the necessity of immersing the entire mercury column.

Range, 0 to 220 degrees F. 2 degree divisions. Length, 12 inches.

No. **21274**...................................each **$3.50**

Taylor Angle-Stem Thermometers



Typical Angle Thermometer

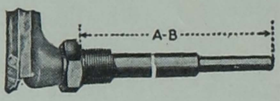
The Taylor Angle-Stem Thermometers are standard stock instruments, adapted in design and construction to conditions where the heat medium is water, steam, vapor, oil, or other liquids.

Taylor Industrial Thermometers are available also for special industrial requirements. When ordering or writing for recommendations and quotations, always give complete details of application.

Order should specify always which of the following standard stock ranges is wanted: Minus 40 to plus 100° F.; 0 to 100° F.; 30 to 160° F.; 30 to 240° F.; 30 to 400° F.; 100 to 750° F.; 200 to 350° F. Ranges 50 to 400° F., 100 to 750° F., and 200 to 350° F. are furnished only with 9 or 12-inch scale thermometers.

Thermometers will be furnished in degrees centigrade if so specified, without extra charge.

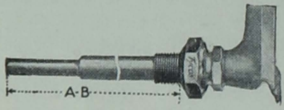
With ¾-Inch Fixed Thread Connection



Stem Length, AB, 3½ Inches

No.	24296	24297	24298
Each	$16.25	14.75	13.50
Scale..in.	12	9	7

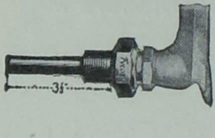
With Union Connection Bulb and ¾-Inch Threaded Bulb



Stem Length, AB, 3½ Inches

No.	24240	24241	24242
Each	$19.25	17.75	16.50
Scale..in.	12	9	7

With Union-Connection Bulb and ¾-Inch Threaded Separable Socket



Stem Length, Including Thread, 3½ Inches

No.	24164	24165	24166
Each	$20.25	18.75	17.50
Scale........in.	12	9	7

Extras for Greater Length of Stem

Thread Connection

Stem 6 Inches Long	each	$.75
Each Additional 6 Inches or Fraction of Stem AB over 3½ Inches	each	1.50

Union Connection

Stem 6 Inches Long	each	$.75
Each Additional 6 Inches or Fraction of Stem AB over 3½ Inches	each	1.50

Separable Socket Connection

Stem 6 Inches Long	each	$3.00
Each Additional 6 Inches or Fraction of Socket Stem over 3½ Inches	each	2.00

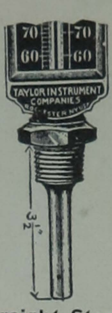
Extension Neck

With 2½-Inch Extension Neck between Top of Thread and Hub	each	$1.00
Each 6-Inch or Fraction of Extension Neck Longer than 2½ Inches	each	4.00

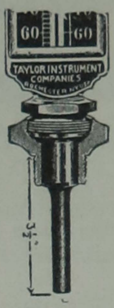
For thermometers with maximum range above 750° F. and not exceeding 950° F., in 12-inch scale only, add to price $8.00.

For thermometers with minimum range below minus 40° F. and not lower than 100° F., add $7.50 to price.

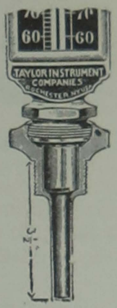
Taylor Straight-Stem Thermometers



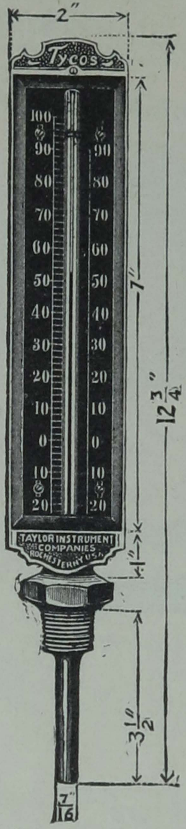
Straight Stem With Thread Connection



Straight Stem with Union Connection Showing Pipe Threaded Hub in Cross Section



Straight Stem with Separable-Socket Connection Showing Socket in Cross Section



Straight-Stem Thermometer with 7-Inch Scale and Thread Connection

The Taylor Straight-Stem Thermometers listed are standardized patterns with scales graduated in the different stock temperature ranges enumerated. In design and construction they are adapted to conditions where the heat medium is water, steam, vapor, oil, or other liquids.

They can be graduated for other temperature ranges, if practicable in the scale size desired, and will be furnished at same price when temperature ranges are within the limits of 40° below zero and 750° above, Fahrenheit.

Taylor Thermometers can be furnished for specific industrial requirements, and are standardized for a wide range of applications. When ordering, always give complete details of application.

Stock approximate temperature ranges are: minus 40° to plus 100°, 0° to 100°, 30 to 160°, 30° to 240°, 50° to 400°, 100° to 350°, 100° to 750°, 170° to 270°, 200° to 350° F.

When ordering always specify temperature range desired.

Will be furnished graduated in degrees Centigrade, if specified, without extra charge.

Graduated for temperature range selected. Threaded for ¾-inch pipe-tap.

With Thread Connection

No. 24134, with 12-Inch Scale	each	$15.25
No. 24135, with 9-Inch Scale	each	13.75
No. 24136, with 7-Inch Scale	each	12.50

With Union Connection

No. 24077, with 12-Inch Scale	each	$18.25
No. 24078, with 9-Inch Scale	each	16.75
No. 24079, with 7-Inch Scale	each	15.50

With Separable-Socket Connection

No. 24001, with 12-Inch Scale	each	19.25
No. 24002, with 9-Inch Scale	each	17.75
No. 24003, with 7-Inch Scale	each	16.50

Extras

For ranges above 750° F., and not exceeding 950° F., or equivalent centigrade, add $8.00 to price.

For ranges below minus 40° F., and not lower than minus 100° F., add $7.50 to price. (Less in quantities.)

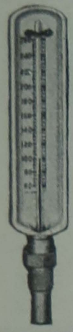
For Thread-Connection Thermometers with stem longer than 3½ inches, each 6-inches or fraction thereof, add $1.50 to price.

For Union-Connection Thermometers with stem longer than 3½ inches, each 6 inches or fraction thereof; add $1.50 to price.

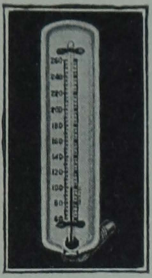
For Separable-Socket-Connection Thermometers with socket stems longer than 3½ inches, each 6 inches or fraction thereof, add $2.00 to price.

American Porcelain Enameled Thermometers

For Hot Water or Steam Heating Boilers



No. 670



No. 680

The frame is fabricated of enameling iron. It is finished in vitrified porcelain enamel and mounted on the stud with a set screw that permits rotating the instrument in the proper position for convenient reading.

The graduations, figures and letters are fused into the porcelain enameled finish making a scale very legible and easy to clean.

Instruments are made with graphite bath.

Regularly finished in white vitrified porcelain enamel but if specified, can be finished in any desired color or combination of colors. Packed 1 in a carton.

No. 670 Straight Stem

Weight each with carton, 8 ounces.

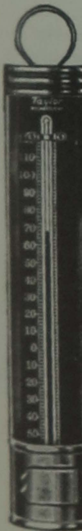
No. **670**, Scale Range 60° to 260° F	each	**$.80**
No. **670**, Scale Range 40° to 240° F	each	**.80**
No. **670**, Scale Range 80° to 240° F	each	**.80**

No. 680 Angle Stem

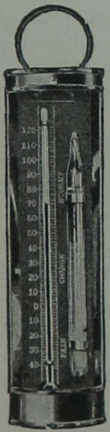
Weight each with carton, 9 ounces.

No. **680**, Scale Range 60° to 260° F	each	**$.90**
No. **680**, Scale Range 40° to 240° F	each	**.90**
No. **680**, Scale Range 80° to 240° F	each	**.90**

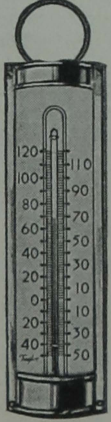
Taylor Metal Case Thermometers



No. 5420-S-8



No. 5370



No. 5154

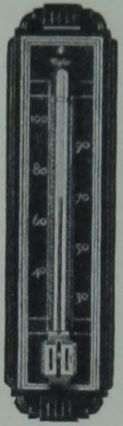
The sturdiness of these thermometers recommends them for hundreds of applications; such as in the barn, fruit cellar, or on the porch as a weather instrument.

Magnifying red liquid filled glass tube mounted in metal case, 8 inches long.

No. 5370 has a stormglass (thermometer) mounted in coppered case on same scale as the tube.

Packed in individual boxes, 12 in a carton.

No. **5420-S-8**, Black Oxidized Scale in Japanned Metal Case	per dozen	**$12.00**
No. **5370**, Storm Glass and Thermometer in Coppered Case	per dozen	**12.00**
No. **5154**, Thermometer Only in Coppered Case	per dozen	**10.00**



No. 5107 Taylor Wall Thermometers

Indoor temperature range.

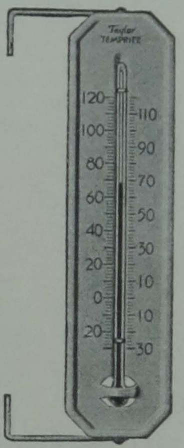
Scale is 6 inches long with polished lacquer background, molded back. Overall length, 7 inches.

Available in three colors, 2-toned red, 2-toned blue, and 2-toned brown.

Packed in individual boxes, 6 in a carton.

No. **5107**	per dozen	**$24.00**

No. 5316 Taylor Temprite Window Thermometers



This thermometer has a white-vitreous enameled steel frame, and a distance reading scale, which reflects light, making it easy to read the temperature even from inside a lighted room at night. Size, 8½x2 inches. A guard allows good air circulation around the bulb.

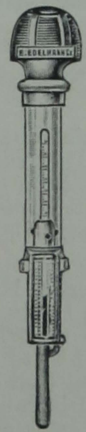
Has red-liquid-filled lens-front tube, and brackets for attaching to either side of window frame and adjustable to any convenient angle.

It is individually packed in lithographed box, with instructions for installation and use; one dozen in a carton.

Weight per dozen, about 3½ pounds.

No. **5316**	per dozen	**$12.00**

No. 40 Thermo Break-Not Battery Testers

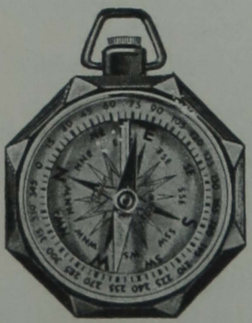


This tester combines all the latest improvements in the scientific testing of storage batteries.

Hydrometer is equipped with thermometer that is filled with Dia-Merculac, a quick-acting non-fading red liquid, and an individual correction table that corrects for the error that exists in specific gravity, because of the change in temperature of battery acid. Thermometer registers temperature of battery acid.

No. **40**, Complete	each	**1.25**
Rubber Bulb Only	each	**.35**
Glass Jar	each	**.35**
Hydrometer Tip with Thermometer	each	**.50**
Hydrometer Float Only	each	**.35**

No. 2920 Taylor Leedawl Compasses



Will withstand hard service. Made of material that won't tarnish or discolor, with unbreakable glass.

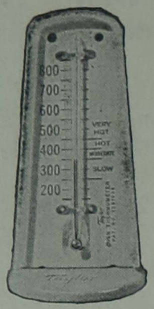
Moisture-proof case; can be immersed in water without damage.

Jewelled center assures accuracy. Needle rotates on jewelled bearing. Aluminum dial. Has throw-off to protect needle and point when not in use. Has ring for attaching to chain or strap.

Case is black bakelite.

No. **2920**	each	**$1.00**

No. 5928 Taylor Home Bake-Oven Thermometers



By eliminating guesswork, baked goods of uniform quality are assured.

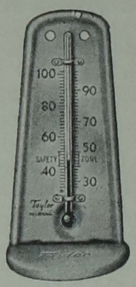
By the use of a Taylor Home Bake-Oven Thermometer properly placed this can be accomplished. There is also a saving of fuel.

Each thermometer is packed in a box accompanied by the Taylor Book of Recipes for roasting meats and baking bread, cakes, etc. Stands 6 inches high. Temperature range 200° to 800° F. Packed one in a box, 6 in a carton.

Weight per dozen, about 6 pounds.

No. **5928**............per dozen **$24.00**

No. 5933 Taylor Refrigerator Thermometers



This thermometer has a 6-inch vitreous enamel scale with range 30 to 100° F.

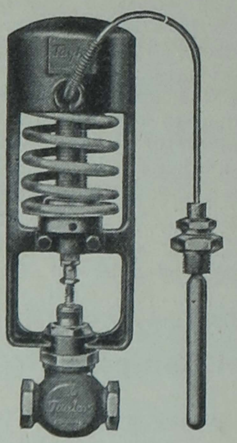
Packed in individual box, 6 in a carton.

Approximate weight, 6 pounds per dozen.

No. **5933**...............................per dozen **$18.00**

No. 36R Taylor Self-Acting Temperature Controllers

Direct-Acting



The double-seated quick-opening valve is standard. The single-seated renewable non-metallic composition disc type can be furnished when a positive shut-off is required.

Standard control ranges: 110 to 170° F.; 130 to 190° F.; 170 to 240° F.; 220 to 280° F.; 265 to 350° F. Ranges 20 to 70° F. and 65 to 130° F. can also be furnished (but only with 17-inch bulb and 1-inch union connection) at a slight extra cost.

Standard equipment includes 10 feet of nickel-plated copper tubing; greater lengths can be supplied in increments of 5 feet, at small extra cost. Steam strainers are included as standard equipment.

When ordering, specify control range, application, medium and pressure through valve.

With Standard Double-Seated Valves

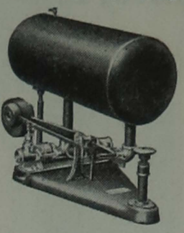
No.	36RJ123	36RJ223	36RJ323	36RJ423	36RJ523	36RJ623
Size.........in.	½	¾	1	1¼	1½	2
Press. Limit.lbs.	150	150	150	150	150	150
Each	**$55.00**	**59.00**	**64.00**	**68.00**	**73.00**	**82.00**

With Single-Seated, Composition Disc Valves

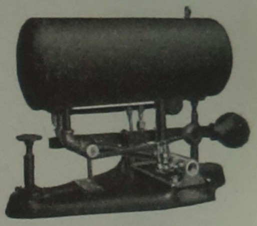
No.	36RA123	36RA223	36RA323
Size.........in.	½	¾	1
Press. Limit.........lbs.	120	120	150
Each	**$55.00**	**59.00**	**64.00**

Morehead Tilting Steam Traps

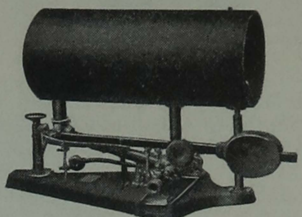
For 200 Pounds Steam Working Pressure



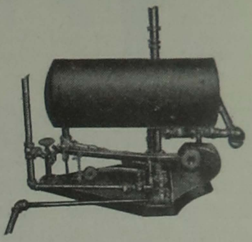
Non-return Type



Variable Pressure Type



Return Type



Vacuum Type

Condenser Type

The non-return type is adapted for the removal of condensation from high or low pressure steam mains, dryers, heaters, etc., and delivering the water to an open tank, hot well or feed water heater.

Has a removable seat and disc in the valve.

Discharges from low point, insuring an effective water seal at all times.

The return type removes water of condensation from heating, drying and cooking apparatus and returns the condensation direct to the boilers, regardless of difference in pressure or the location of the apparatus, whether above or below the water line.

The variable pressure trap is a conbination of the essential features of both the return and non-return machines. Like the non-return trap, this machine has a positive cut-off valve on the discharge side, while in accordance with return trap practice it is provided with a live steam connection, mechanically controlled, for evacuating purposes during low pressure drainage periods.

The vacuum type removes automatically all condensation from exhaust lines and oil separators operating under a vacuum, without breaking or impairing the vacuum.

The condenser type drains exhaust steam and reduced pressure heating, cooking and drying apparatus. It accelerates steam travel, reduces back pressure and increases efficiency.

Non-return and Variable Pressure Steam Traps

No. of Trap		—Cap., Lin. Ft.—		Direct Radiation Sq. Ft.	Water Discharged per Hr. Gal.	Inlet and Outlet Inches
Non-return	Variable Pressure	1-inch Pipe	Hot Blast Heater			
21	**31**	12000	1300	3000	200	1
22	**32**	25000	2400	5200	400	1¼
23	**33**	40000	5200	12000	600	1½
24	**34**	60000	9000	21000	720	2
25	**35**	90000	16000	33000	900	2½
26	**36**	140000	25000	50000	1300	3

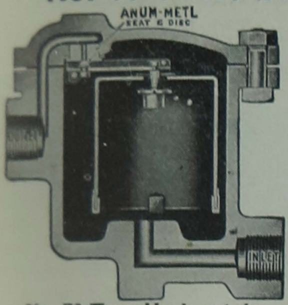
Return, Vacuum and Condenser Steam Traps

No. of Trap			—Cap., Lin. Ft.—		Direct Radiation Sq. Ft.	Water Discharged per Hr. Pounds	Size Drum In.	Inlet and Outlet In.	Steam Pipe Connections In.
Return	Vacuum	Condenser	1-inch Pipe	Hot Blast Heater					
1	**41**	**51**	5000	1000	2300	1050	10x24	1	1
2	**42**	**52**	9000	1800	4000	1850	12x30	1¼	1
3	**43**	**53**	20000	4000	9000	4000	14x36	1½	1¼
4	**44**	**54**	35000	7000	16000	6000	16x40	2	1¼
5	**45**	**55**	50000	12000	25000	11000	18x42	2½	2
6	**46**	**56**	75000	18000	40000	15000	18x42	3	2

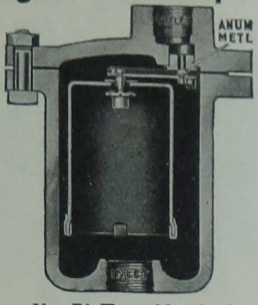
Prices upon application.

Note.—Quotations on copper or brass tanks with bronze brass, nickel, steel or cast iron made on request.

No. 70 Series Strong Steam Traps



No. 70 Trap Horizontal Inlet and Outlet



No. 71 Trap Vertical Inlet and Outlet

The No. 70 Series Strong Traps are especially suitable for draining unit heaters, cookers, pressing machines, high or low pressure pipe coils, as riser drip traps, etc.

Anum-Metl valves and seats guaranteed leak-proof for one year.

Wear-proof parts. Anti-balancing device. As the clearance between the hole in the bucket and the spindle provides the air vent, the bucket moves up and down on the tapered spindle each time the trap discharges, thus preventing the vent becoming plugged.

Capacities given below are based on traps fitted with proper orifice and discharging intermittently. Although with continuous discharge, the traps would have a capacity greater than shown, it is recommended that traps be selected oversize to care for pressure fluctuations, etc.

Prices given below are for traps with semi-steel bodies. The No. 71 trap is also furnished with cast steel body and cover for pressures up to 250 pounds, each $24.00.

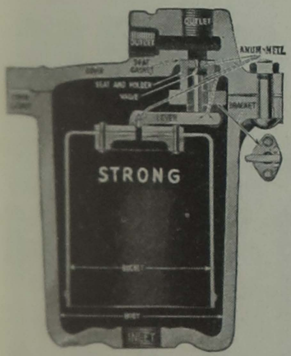
Special No. 70 Series traps built for ammonia service.

			Capacity, Pounds Water per Hour					
			Pressure, Pounds					
No.	Each	Connections Inches	10	30	125	200	Height Inches	Weight Pounds
70	$8.00	½	500	800	600	*	4$^{13}/_{16}$	5¼
71	10.50	½	700	1000	700	500	5⅞	7½

*No. 70 trap not furnished for pressures above 125 pounds.

Strong Inverted Bucket Steam Traps

80-Series



This trap has Anum-Metl seat and discs; stainless steel buckets except No. 80 which has drawn copper bucket; anti-balancing device; improved seat construction.

Either vertical or horizontal outlet may be used for the trap discharge. The outlet not used for the trap discharge is available for testing the tightness of the valve and seat without disconnecting any piping or requiring extra fittings.

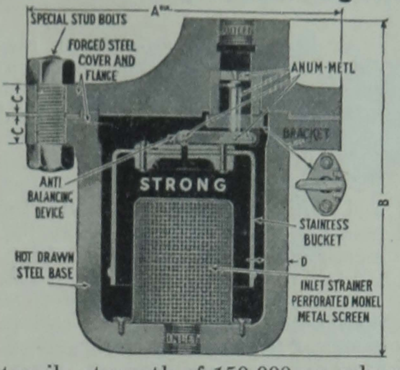
For pressures of 0 to 225 pounds. In ordering state highest pressure under which trap will be operated.

Capacities given are based on 125 pound seat operating at 125 pounds pressure. For approximate capacities at various pressures (using proper seat orifice), multiply capacities given below by the following factors: 250 pounds, .50; 200 pounds, .75; 125 pounds, 1.00; 30 pounds, 2.00; 10 pounds, 1.30.

No.	Each	Size Pipe Connections Inches	Rated Capacity Water per Hour Pounds	Continuous Discharge Capacity Pounds	Greatest Diameter Inches	Height Over All Inches	Wt., Lbs.
80	$17.00	½	1000	1450	6¼	8	15¼
81	22.50	¾	2100	3075	7⅞	9½	20
82	30.00	1	4600	6300	8¼	10⅞	31
83	37.00	1¼	7000	9200	9½	12	47
84	55.00	*1½ or 2	12000	14250	11½	14¼	75
85	73.00	†2 or 2½	20000	27850	12½	16½	114

*1½-inch size furnished unless otherwise specified.
†2-inch size furnished unless otherwise specified.

No. 80-S Series Strong Forged Steel Traps



Fitted with anti-balancing device and internal strainer. *Wear-proof parts, Anum-Metl valves and seats of improved design.

Designed for high pressures and temperatures, built for steam working pressures of 1800 pounds. The forged steel base and cover are bolted together with special alloy high temperature studs having a tensile strength of 150,000 pounds with elongation of 18 per cent in 2 inches.

For temperatures up to 800 degrees Fahrenheit and pressures to 800 pounds, regular forged steel traps are recommended. For pressures above 800 pounds or temperatures to 800 degrees Fahrenheit, special heavy forged steel traps are recommended.

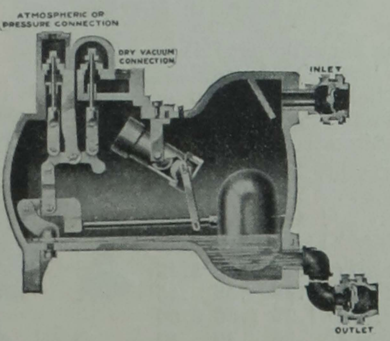
Forged steel traps, constructed with bodies and covers of special chrome steel and fitted with stainless steel buckets, are furnished on special order for temperatures above 800 degrees Fahrenheit. Strong Forged Steel Traps with flanged connections furnished, prices upon application.

				Capacity, Pounds Water, Per Hour				
				Pressure, Pounds				
No.	Regular Forged Steel Trap with Stainless Steel Bucket Each	Special Heavy Forged Steel Trap with Stainless Steel Bucket Each	Pipe Size In.	200	400	600	1000	Weight Pounds
80S	$55.00	....	½	900	675	...	....	35
81S	68.00	....	¾	2500	1250	800	....	55
82S	90.00	$142.00	1	4100	2800	2000	1300	95
83S	125.00	180.00	1¼	6800	3900	2500	1900	140
84S	150.00	230.00	1½ or 2	10000	6500	4500	2900	220

*If strainers are not wanted, deduct $2.85 from prices.

Type A Strong Vacuum Traps

For Automatically Removing Condensation from Vacuum Lines of Condensing Engines, Vacuum Oil Separators, Etc.



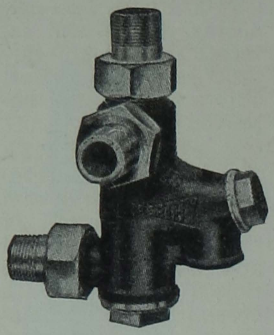
Strong Vacuum Traps automatically remove the water of condensation from the vacuum line, discharging same to the atmosphere.

The Type A Trap is designed for atmospheric discharging only and requires no steam for its operation.

The illustration shows the position of the working parts after the trap has discharged. The vacuum valve is open and the same vacuum carried on the system to which the trap is attached has been established in the trap through dry vacuum connection and the water flows into the trap by gravity.

Size No.	Each	Outlet and Inlet In.	Floor to Center Inlet In.	Total Lgth. In.	Total Hgt. In.	Wdth. Body In.	Cap. Gal. per Hr.	Ship. Wt. Lbs.
8A	$190.00	1½	16	25	23	12½	400	235
9A	302.00	2	19	28½	29	19	800	410
10A	330.00	3	19	28½	29	19	1600	430

Penberthy Automatic Injectors

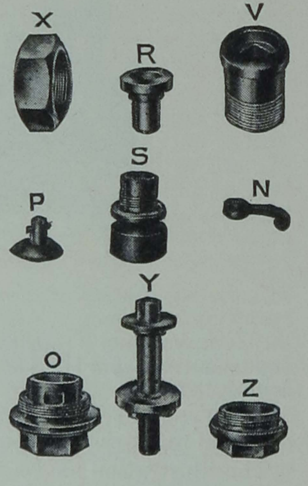


A high-grade automatic machine; meaning, if the current of water is broken by any cause, the injector will pick up the water and re-establish the current to the boiler without the least attention. Every machine is carefully tested, and will work on the following points: Start low, 20 to 22 lbs. steam on 3-foot lift. Work high, 165 to 170 lbs. steam on 3-foot lift. Lift water, 20 to 24 feet on 60 to 80 lbs. steam. Will deliver water to boiler at 160 to 212 degrees, according to temperature of feed water and steam pressure. Water 200 to 212 degrees can nearly always be delivered at nearly all pressures over 50 lbs. by throttling suction valve and delivering minimum capacity. It is advisable in many cases to install an injector large enough so that the supply can be cut down and attain this result, thereby saving fuel. By placing a short piece of pipe having a stopcock, in the overflow, and closing after the injector has started, water 8 to 10 degrees hotter can be handled, but the injector is rendered non-automatic while the stopcock is closed.

Size	Each	H.P. Based on Ordinary Tubular Boiler	H.P. Based on 30 Lbs. Water per H.P. per Hour	Pipe Connections Inches	Gallons per Hour 1 to 3-Ft. Lift 60 to 110 Lbs. Steam Pressure Max.	Min.
O	**$15.00**	3 to 6	4 to 8	¼	60	35
OO	**16.00**	4 to 8	6 to 12	⅜	80	45
A	**18.00**	8 to 16	10 to 20	½	135	70
AA	**20.00**	12 to 22	15 to 30	½	180	100
B	**25.00**	17 to 32	22 to 45	¾	260	140
BB	**30.00**	20 to 45	25 to 60	¾	360	180
C	**40.00**	40 to 65	45 to 80	1	475	250
CC	**45.00**	45 to 80	50 to 100	1	600	325
D	**55.00**	50 to 100	60 to 135	1¼	800	425
DD	**60.00**	75 to 135	85 to 165	1¼	1000	525
E	**75.00**	100 to 180	125 to 235	1½	1400	740
EE	**90.00**	115 to 255	150 to 320	1½	1900	850
F	**110.00**	160 to 320	200 to 400	2	2400	1275
FF	**125.00**	200 to 400	250 to 500	2	3000	1600
GG	**200.00**	375 to 600	400 to 750	2½	4200	2150

Repair Parts

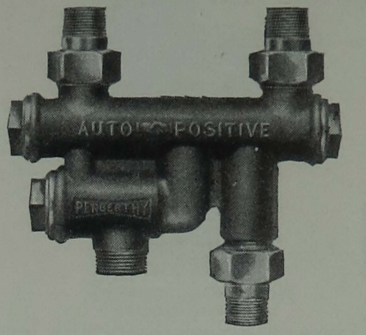
In ordering parts do not fail to give serial letter and number, which will be found on top of overflow. In referring to or ordering parts, designate them by letter or name.



Size of Injector......	O OO	A AA	B BB
R—Steam Jet....each	**$.25**	**$.35**	**$.45**
S—Suction Jet...each	**.25**	**.35**	**.45**
Y—Delivery Jet..each	**1.25**	**1.50**	**2.00**
X—Coupling Nut..each	**.25**	**.30**	**.40**
V—Tail Pipe.....each	**.25**	**.30**	**.40**
Z—Overflow Cap..each	**.30**	**.40**	**.50**
P— " Valve..each	**.40**	**.50**	**.60**
N— " Hinge.each	**.10**	**.10**	**.15**
O—Plug.......each	**.60**	**.80**	**1.00**
Strainer........each	**.40**	**.45**	**.50**

Size of Injector......	C CC	D DD	E	EE	F	FF	GG
R—Steam Jet....each	**$.55**	**$.65**	**$.75**	**$.75**	**$.85**	**$1.00**	**$2.00**
S—Suction Jet....each	**.55**	**.65**	**.75**	**.75**	**.85**	**1.00**	**3.00**
Y—Delivery Jet...each	**2.50**	**3.00**	**3.75**	**4.50**	**5.50**	**6.50**	**9.00**
X—Coupling Nut..each	**.50**	**.60**	**1.25**	**1.25**	**1.50**	**1.50**	**2.00**
V—Tail Pipe.....each	**.50**	**.60**	**.80**	**.80**	**1.00**	**1.00**	**1.25**
Z—Overflow Cap..each	**.60**	**.70**	**.80**	**.80**	**.90**	**.90**	**1.50**
P— " Valve..each	**.75**	**.90**	**1.00**	**1.10**	**1.25**	**1.25**	**1.75**
N— " Hinge..each	**.15**	**.15**	**.20**	**.20**	**.20**	**.20**	**.30**
O—Plug........each	**1.25**	**1.50**	**1.75**	**1.75**	**2.00**	**2.00**	**4.00**
Strainer........each	**.55**	**.60**	**.75**	**.75**	**1.00**	**1.00**	**1.50**

Penberthy Auto-Positive Injectors

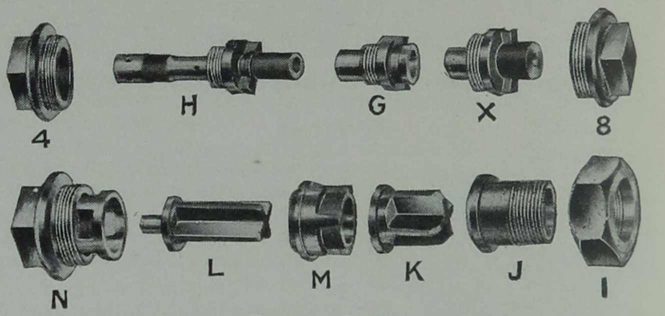


This injector operates between 150 and 200 pounds pressure, handling water that has become heated by the use of a syphon, and consequently too hot for injectors of the usual automatic type. It has five working parts, and combines the features of a positive and automatic injector.

Will start on a short lift at 20 to 25 pounds pressure and operate to 200 pounds pressure, water 74° Fahrenheit. At winter temperature, works to 240 pounds pressure. Will lift 3 feet at 200 pounds pressure to 20 to 23 feet at 65 to 120 pounds. Will handle hot water at 130° to 135° at 75 to 100 pounds; 125° to 130° at 50 to 120 pounds; 110° to 115° at 35 to 150 pounds; 90° to 95° at 28 to 175 pounds; under 60° at 30 to 225 pounds and under 40° at 35 to 240 pounds.

By placing a cock in the overflow, water 6° to 8° hotter can be handled. This renders the injector non-automatic while stopcock is closed.

No.	Horsepower Allowing 7½ to 8 Gals. per H.P. per Hour	Pipe Connections Inches Steam	Suction	Delivery	Capacity per Hour 75 to 125 Pounds Steam, 3-Ft. Lift Gallons Max.	Min.	Price Each
112	5 to 15	⅜	⅜	⅜	120	40	**$18.00**
113	7 to 25	½	½	½	200	60	**20.00**
115	16 to 50	¾	¾	¾	400	130	**30.00**
117	28 to 85	1	1	1	675	225	**45.00**
119	47 to 145	1¼	1¼	1¼	1125	375	**60.00**
121	87 to 265	1½	1½	1½	2000	700	**90.00**
123	125 to 400	2	2	2	3000	1000	**125.00**
125	200 to 600	2½	2½	2½	4200	1500	**200.00**



Repair Parts

Size of Injector..................		112	113	115	117
8—Steam Plug..............	each	**$.70**	**$.80**	**$.80**	**$.90**
X—Steam Jet..............	each	**.40**	**.50**	**.60**	**.75**
G—Suction Jet............	each	**.30**	**.40**	**.50**	**.60**
H—Delivery................	each	**.90**	**1.00**	**1.50**	**2.00**
4—Delivery Plug..........	each	**.60**	**.70**	**.80**	**.90**
N—Overflow Plug..........	each	**.75**	**.80**	**1.00**	**1.25**
L—Pressure Valve.........	each	**.25**	**.30**	**.45**	**.60**
M—Pressure Valve Collar...	each	**.30**	**.40**	**.60**	**.90**
K—Vacuum Valve..........	each	**.25**	**.30**	**.45**	**.60**
I—Coupling Nut...........	each	**.25**	**.30**	**.40**	**.50**
J—Tail Pipe...............	each	**.25**	**.30**	**.40**	**.50**
Strainer....................	each	**.40**	**.45**	**.50**	**.55**
Tool for Removing Jet......	each	**.45**	**.50**	**.60**	**.70**
Size of Injector..................		**119**	**121**	**123**	**125**
8—Steam Plug..............	each	**$1.10**	**$1.40**	**$1.70**	**$2.50**
X—Steam Jet..............	each	**.90**	**1.00**	**1.20**	**2.00**
G—Suction Jet............	each	**.75**	**.85**	**1.00**	**1.50**
H—Delivery................	each	**3.00**	**4.00**	**5.50**	**8.00**
4—Delivery Plug..........	each	**1.10**	**1.40**	**1.70**	**2.50**
N—Overflow Plug..........	each	**1.50**	**1.75**	**2.00**	**3.00**
L—Pressure Valve.........	each	**.75**	**1.00**	**1.25**	**2.00**
M—Pressure Valve Collar...	each	**1.25**	**1.75**	**2.25**	**3.00**
K—Vacuum Valve..........	each	**.75**	**1.00**	**1.25**	**1.75**
I—Coupling Nut...........	each	**.60**	**1.25**	**1.50**	**2.00**
J—Tail Pipe...............	each	**.60**	**.80**	**1.00**	**1.25**
Strainer....................	each	**.60**	**.75**	**1.00**	**1.50**
Tool for Removing Jet......	each	**.80**	**.90**	**1.00**	**1.50**

In ordering parts give size number; also, if possible, shop number of injector.

Penberthy XL-96 Improved Ejectors

Lifts 22 to 25 Feet
Elevates 25 to 100 Feet
Pressure 30 to 100 Pounds

PENBERTHY
XL-96

The lifting and elevating power is so combined in the XL-96 Ejector as to make it unsurpassed by any device of its kind. The principle and power contained in so small, handy and economical an instrument, continually suggests new uses, which often demand that the tubes of the ejector be proportioned particularly for the service. The manufacturer is prepared to furnish special ejectors singularly efficient in the work for which they are designed.

No.	Brass Each	Iron Body Brass Jets Each	Steam Connection In.	Suction and Discharge In.
1	**$8.00**	.....	⅜	½
2	**10.00**	.....	½	¾
3	**15.00**	.....	¾	1
4	**20.00**	.....	1	1¼
5	**25.00**	**$20.00**	1	1½
6	**35.00**	**27.50**	1¼	2
*7	**50.00**	**40.00**	1½	2½
*8	**70.00**	**50.00**	2	3
*9	**105.00**	**70.00**	2	3½
*10	**145.00**	**95.00**	2½	4

	Capacity, Gallons per Hour				Vertical Lift Feet	
No.	3-Ft. Lift 40-65 Lbs. Steam Press.	3-Ft. Lift 20-40 or 65-100 Lbs. Steam Press.	50-Ft. Eleva. 40-65 Lbs. Steam Press.	25-Ft. Eleva. 40-65 Lbs. Steam Press.	40-75 Lbs.Steam Press.	25-40 or 75-100 Lbs.Steam Press.
1	240	235	120	180	23	20
2	500	450	250	375	25	22
3	840	700	420	625	25	22
4	1350	1300	650	950	25	22
5	1950	1850	975	1450	25	22
6	3500	3000	1750	2600	25	22
*7	5700	4350	2500	3750	25	22
*8	9500	8150	4750	7200	25	22
*9	13600	12400	6800	10200	25	22
*10	18400	17100	9200	13800	25	22

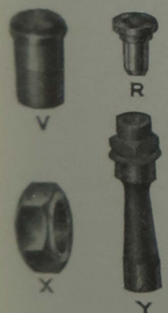
Sizes 5 and 6 will be sent in all brass, unless ordered with iron body and brass jets and steam connection.

*Unless ordered in brass, sizes 7 to 10 inclusive, will be shipped with iron body, brass jets and steam connection.

Table Showing Size of Boilers Required for Ejectors

No. of Ejector..........	1, 2, 3	4, 5, 6	7, 8	9, 10
Size of Boiler........h.p.	2 to 6	8 to 12	15 to 20	25 to 30

Repair Parts



Size No.	R-Steam Jet Each	Y-Del. Jet Each	V-Tail Pipe Brass Each	X-Coupling Nut Brass Each	Strainer Each
1	**$.25**	**$.80**	**$.25**	**$.25**	**$.45**
2	**.35**	**1.00**	**.30**	**.30**	**.50**
3	**.45**	**1.25**	**.40**	**.40**	**.55**
4	**.55**	**1.50**	**.50**	**.50**	**.60**
5	**.60**	**1.75**	**.50**	**.50**	**.75**
6	**.80**	**2.50**	**.60**	**.60**	**1.00**
7	**1.00**	**4.00**	**.80**	**1.25**	**1.50**
8	**1.25**	**6.00**	**1.00**	**1.50**	....
9	**1.50**	**8.00**	**1.00**	**1.50**	....
10	**2.00**	**10.00**	**1.25**	**2.00**	....

Special Acid Resisting or All Iron Ejectors

Furnished on special order; prices on application.

Penberthy Hydraulic Ejectors

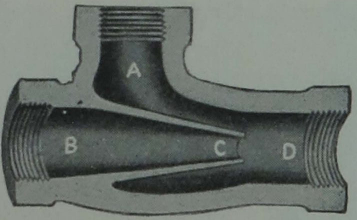
The demand for an ejector operated by water as a motive power, has necessitated the development of the ejector shown in the illustration above. It is designed to meet conditions where the water pressure operating the same is from 15 to 200 pounds and the elevation or discharge does not exceed 50 feet. All details are proportioned to give the highest efficiency under these conditions, with a minimum operating water consumption.

Water consumption varies according to pressure, capacity, and elevation. The water pressure controls the elevation, but it is safe to figure four pounds of pressure to every foot of elevation. The table below shows capacities under different pressures.

No.	Operating Size Inches	Size of Suction Inches	Size of Delivery Inches	Length In.	Capacity, Gallons per Hour 40 Lbs Pressure	Capacity, Gallons per Hour 60–80 Lbs. Pressure	Price Each
62	⅜	¾	¾	5	500	750	**$10.00**
63	½	1	1	6¾	900	1100	**15.00**
64	¾	1¼	1¼	8	1500	2000	**20.00**
65	1	1½	1½	9	2100	3400	**25.00**
66	1¼	2	2	10½	3000	4500	**35.00**
67	1½	2½	2½	11½	4200	6000	**50.00**
68	2	3	3	13¼	6000	9000	**70.00**

Capacities given are when ejector is working against a head of 10 feet, and include the operating water.

McDaniel Suction Tees



This is a fitting that will make all bad jobs of steam heating work well.

Stops one steam connection from backing up on another, prevents all noise when heating water by direct blow of steam.

It can be used to advantage in making all connections on heating jobs. Where condensation returns to the boilers, put it on wherever two returns come together. It is required wherever two or more connections are made to the same steam trap, as it will cause all the condensation to flow freely into the trap and avoid the trouble of one backing up on another, and one steam trap can be made to answer for several different connections, avoiding the necessity of putting a steam trap on each return, if all are from the same boiler. All sizes are made of cast iron. Cannot be used to lift liquids.

Standard Tees

For 100 Pounds Steam Working Pressure

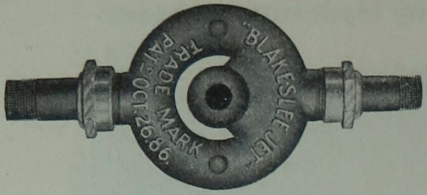
Size Inches	Each	Size Inches	Each	Size Inches	Each
½	**$1.50**	1¼	**$2.25**	2½	**$5.50**
¾	**1.50**	1½	**2.75**	3	**8.00**
1	**2.00**	2	**3.50**	...	....

Extra Heavy Tees

For 250 Pounds Steam Working Pressure

Size Inches	Each	Size Inches	Each	Size Inches	Each
1	**$3.50**	2½	**$11.00**	5	**$43.00**
1¼	**4.50**	3	**16.00**	6	**60.00**
1½	**5.50**	3½	**21.00**	...	.....
2	**7.50**	4	**27.00**	...	.....

Blakeslee Jet Pumps



For raising water and other liquids. Adapted for tanneries, breweries, creameries, railroad water stations, etc.

Size Pump Inches	Suction Pipe Inches	Discharge Pipe Inches	Steam Pipe Inches	Capacity Gallons per Minute	Price Each
3/4	3/4	1/2	3/8	8	**$8.00**
1	1	3/4	1/2	15	**10.00**
1 1/4	1 1/4	1	1/2	20	**12.00**
1 1/2	1 1/2	1 1/4	3/4	30	**14.00**
2	2	1 1/2	3/4	40	**16.00**
2 1/2	2 1/2	2	1	50	**20.00**
3	3	2 1/2	1	60	**24.00**
4	4	3	2	250	**70.00**

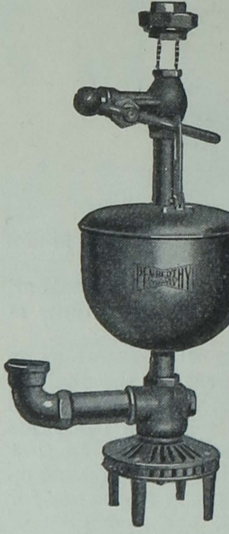
Blakeslee Bilge Pumps

This pump is adapted to raising a large amount of water with but little steam. It is not designed to raise water to very great heights, but makes from 18 to 20 feet suction. It is designed to do its work altogether by suction, and should be set so that the discharge opening will be on a line with the point of discharge.

BILGE 3 IN
BLAKESLEE

Size Pump In.	Suction Pipe In.	Discharge Pipe In.	Steam Pipe In.	Cap. per Hour Gals.	Price Each
1 1/2	1 1/2	1 1/4	3/4	2400	**$10.00**
2	2	1 1/2	1	3000	**14.00**
3	3	2 1/2	1	3600	**16.00**
4	4	3	1 1/4	4500	**20.00**
6	6	4	1 1/2	8000	**30.00**

Model R Penberthy Automatic Cellar Drainers



The Penberthy Automatic Cellar Drainer is of distinct service for installations such as office buildings, residence or factory basements, sumps, tanks, settling basins, flywheel, elevator, coal and scale pits or wherever it is desired to remove seepage, flood or back water from point below the natural drainage level of sewer.

No. 1 has 1/2-inch supply and 1-inch discharge; No. 2 has 3/4-inch supply and 1 1/4-inch discharge.

The Model R drainer requires 4-pound water pressure or more for each 1 foot of elevation, while the low pressure drainer will work on 2 to 4-pound per foot of elevation which can be supplied.

Pit should be placed so that all surplus water will drain to it.

No. 1

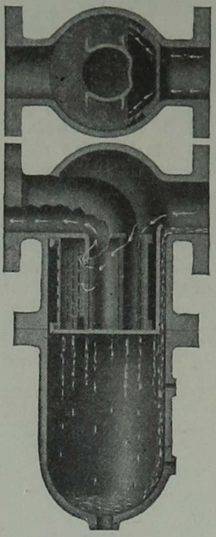
Working Head Ft.	Maximum Stock Drainer Capacities from Sump at 10 to 150 Pounds Water Pressure Gallons per Hour 10	15	20	25	30	40	60	80	100	120	150	Each
3	80	210	300	340	400	510	700	720	700	660	600	**$25**
6	...	90	140	240	300	390	570	670	690	650	600	**25**
9	...	...	90	150	210	330	480	620	660	640	600	**25**
12	...	...	...	100	150	220	390	550	630	630	600	**25**
15	...	...	...	...	90	190	300	450	600	620	600	**25**
18	...	...	...	...	...	120	250	320	550	610	600	**25**
No. 2												
3	190	390	550	620	750	910	1180	1240	1220	1170	1100	**40**
6	...	210	340	420	600	750	1020	1140	1200	1130	1100	**40**
9	...	...	210	300	380	540	900	1090	1150	1090	1100	**40**
12	...	...	...	210	300	420	780	1020	1110	1060	1100	**40**
15	...	...	...	...	210	370	570	940	1050	1030	1100	**40**
18	...	...	...	...	...	300	510	850	970	1000	1100	**40**

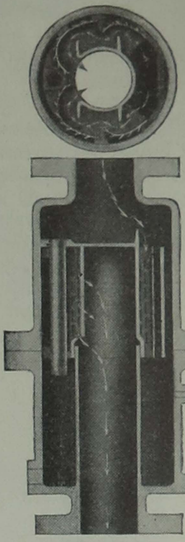
Strong Cage Type Separators

For Steam, Air or Gas

Semi-Steel for Pressures up to 200 Pounds or Temperatures up to 388 Degrees

Cast Steel for Pressures above 200 Pounds and Temperatures Greater than 388 Degrees


Horizontal


Vertical

The function of a separator is to remove or separate the moisture or liquids from a gas (steam, air or gas) by a mechanical process. Liquids enter the separator in two forms, as a precipitated liquid which flows in a stream or film along the bottom of the pipe and as entrained moisture carried in suspension by the steam (air or gas).

As a separator must perform this function in a very limited space, it is necessary to take advantage of every opportunity to increase separation, if the high efficiency desired is to be obtained.

In the Strong Cage Type Separator, special provision has been made for first removing the stream or film of liquid without permitting it to come in contact with the steam (air or gas). This feature allows the separator to bring its complete separating mechanism into use for extracting the entrained moisture only.

In entering the separator, the shape of the current is changed from a circular to a rectangular one. This current is then subjected to several abrupt changes in direction, producing a whip-snapping motion which throws off any moisture, delivering dry steam to the outlet. A special arrangement prevents the flow from picking up any liquid from the separator collecting chamber.

Regularly furnished with extra heavy flanges. Can be furnished with standard flanges on special order.

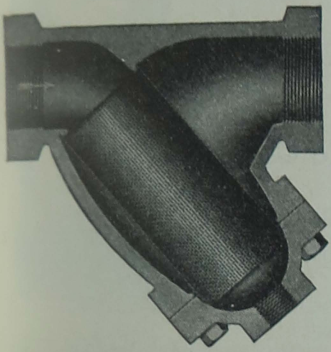
Prices include companion flanges, bolts and gauge glass fittings for semi-steel separators and gauge glass fittings only for cast steel separators.

Size In.	Either Type Semi-steel Each	Cast-steel Each	Distance Between Flanges Inches Vert.	Hor.	Center Pipe Line to Bottom Drip Pocket In. (Hor.)	Diam. Body Either Type In.	Approx. Ship. Wt., Lbs. Each Vert.	Hor.
3	**$65.00**	**$150.00**	20 3/8	13 1/4	17 1/4	8	165	167
4	**90.00**	**165.00**	26	15 3/4	23	10	265	377
5	**140.00**	**220.00**	33 1/2	18 3/4	27	12 1/2	445	465
6	**175.00**	**300.00**	39 1/2	21 1/2	32	14 1/2	665	665
7	**225.00**	**370.00**	42 5/8	23 3/4	35	17	750	775
8	**275.00**	**425.00**	48 1/2	26 1/4	37 1/2	18 1/2	975	1000
10	**480.00**	**770.00**	54 1/2	32 1/2	46	23 1/2	1650	1850

Davis Strainers

Self-Cleaning Type

For 250 Pounds Working Pressure



Screwed

A strainer should be used in all pipe lines serving equipment having internal movable parts, such as pressure regulators, steam traps, meters, turbines, valves, pumps, and engines. Possible damage from scale or other foreign matter is prevented, life of equipment is prolonged, and uninterrupted service is assured.

The Davis Strainer permits an unobstructed flow. Its screen area is several times that of the pipe size. It may be used in either a horizontal or vertical pipe line.

The screen is placed in the strainer with one end open to the inlet port and the other end open to the blowoff. The flow passes from the inlet to the outlet port through the screen. Foreign matter is trapped in the cylinder and may be drawn off through the blowoff.

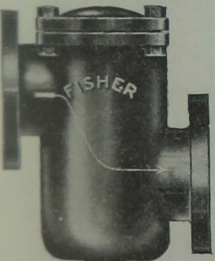
Screens for steam, air, and gas have .024 perforations; screens for water have .046 perforations.

Size In.	Screwed Each	Standard Flanged Each	Extra Heavy Flanged Each	Size In.	Standard Flanged Each	Extra Heavy Flanged Each
½	$5.00	.....	......	4	$90.00	$100.00
¾	6.00	.....	......	5	125.00	135.00
1	7.50	.....	......	6	150.00	160.00
1¼	9.00	.....	......	8	250.00	275.00
1½	10.00	$20.00	$25.00	10	550.00	575.00
2	15.00	25.00	30.00	12	650.00	675.00
2½	20.00	32.00	40.00	..	......	......
3	25.00	40.00	50.00	..	......	......
3½	85.00	90.00	100.00	..	......	......

Fisher Suction Strainers

No. 250, Gravity Flow Type

No. 251, Straightway Type



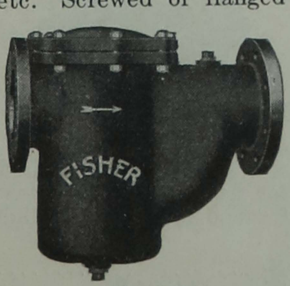
No. 250

These strainers meet practically every installation condition both for off-set and straight-run piping.

Prices below apply to strainers with cast iron bodies with removable bronze basket screens. Several sizes of screen perforations can be furnished to meet installation conditions. Total area of perforations is much larger than the area of the pipe. As regularly furnished, screen has perforations for water service.

Suitable for air, gas, hot or cold water, hot or cold oil, steam, etc. Screwed or flanged bodies are suitable for maximum pressure of 75 pounds. Maximum recommended temperature on strainers with bronze screen for normal service, 500° F., for corrosive oils, 200° F.

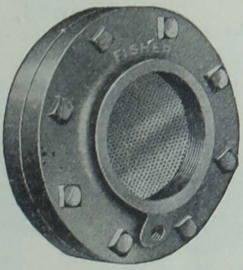
In ordering, specify pipe size, whether screwed or standard flanged connections; kind, pressure, and temperature of fluid passing through strainer.



No. 251

Pipe Size Inches	Each No 250 Scrd.	Each No 250 Std. Flgd.	Each No. 251 Scrd.	Each No. 251 Std. Flgd.	Pipe Size Inches	Each No. 250 Std. Flgd.	Each No. 251 Std. Flgd.
1½	$25.00	.....	$22.50	.....	5	$70.00	$85.00
2	25.00	$30.00	25.00	$32.50	6	90.00	116.00
2½	32.50	35.00	32.50	37.50	8	145.00	182.50
3	.....	35.00	.....	40.00	10	245.00	287.50
3½	.....	47.50	.....	53.50	12	......	392.50
4	.....	57.50	.....	63.50	..	......	......
4½	.....	60.00	.....	85.00	..	......	......

Fisher Cast Iron Pipe Strainers



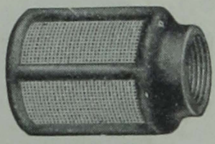
Long experience in steam and power plant specialties has convinced those interested of the necessity of installing a strainer in the pipe line ahead of valve, trap or other specialty. The great percentage of the difficulty experienced with steam specialties is due to scale or other foreign substance getting between the seats and discs. The presence of foreign substance in a valve will interfere with proper closing of valve, causing it to cut out and the low pressure to build up, which is primarily the cause of many troubles.

Unsatisfactory operation due to these causes should not be charged to the regulating device. A certain amount of scale and foreign matter will be found in every piping system, both old and new, and in order to lengthen the life of specialties, the use of the strainers is recommended. By insuring that no dirt will get to the regulating device, which they are serving, they will more than pay for themselves in a short time.

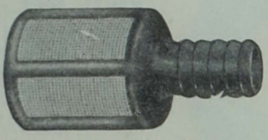
The strainer mesh is of brass with perforations suited to different services, steam, air, water or gas.

Size Inches	Price, Each No. 200 Standard Screwed 125-Lb. Pres.	Price, Each No. 201 Extra Heavy Screwed 250-Lb. Pres.	Price, Each No. 202 Standard Flanged 125-Lb. Pres.	Price, Each No. 203 Extra Heavy Cast Iron 250-Lb. Pres
1½	$10.00	$12.50	.....	......
2	12.50	15.00	$17.50	$20.00
2½	15.00	17.50	20.00	25.00
3	20.00	22.50	25.00	30.00
3½	25.00	27.50	30.00	35.00
4	30.00	35.00	40.00	45.00
5	35.00	40.00	50.00	55.00
6	40.00	55.00	60.00	75.00
8	50.00	65.00	70.00	130.00

Hose and Pipe Strainers



No. 377, Pipe



No. 165, Hose

Sizes 2-inch and larger are of a flat type.

Size Inches	Each Pipe Thread	Each Hose Shank Brass	Each Hose Shank Mali. Iron	Size Inches	Each Pipe Thread	Each Hose Shank Brass	Each Hose Shank Mall. Iron
⅜	$.40	...	...	1½	$.60	$.75	$.60
½	.40	...	...	2	.75	...	...
¾	.45	$.50	$.40	2½	1.00	...	...
1	.50	.55	.45	3	1.50	...	...
1¼	.55	.60	.50	...	....	...	...

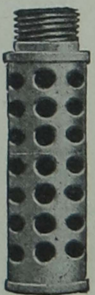
Clearflow Suction Pipe Strainers

Iron Body

No. 6 with Wire Cover

Galvanized; tapped for standard pipe only. With or without fine mesh brass wire cloth cover.

For use with all pumps having close runner or piston clearances which must be protected even from fine sand. This protection is also of great advantage in connection with pressure tank systems to prevent accumulation of sand in the tank.



No. 7 without Cover

Size In.	Each No. 6	Each No. 7	Size In.	Each No. 6	Each No. 7
1	$1.10	$.80	2½	$2.50	$2.20
1¼	1.20	.90	3	3.25	3.00
1½	1.50	1.25	3½	4.00	3.50
2	1.80	1.35	4	5.00	4.00

Malleable Iron Ammonia Fittings

Screwed, with Soldering Recess

No. 260-E, Elbow

No. 264-E, Tee

No. 266-E, Cross

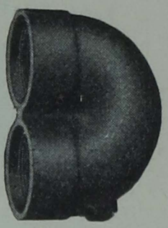
For working pressures up to 300 pounds. Air tested.

Hydraulic pattern.

Reducing sizes elbows, tees and crosses will be furnished at 15 per cent advance over straight sizes.

	Each					
Size Inches	No. 260-E Elbows	No. 262-E 45° Elbows	No. 264-E Tees	No. 266-E Crosses	No. 267-E Reducers	No. 1540 *Solid Plugs
¼	$.20	$.25	$.30	$.60	....	$.04
⅜	.25	.30	.40	.80	$.25	.04
½	.30	.35	.45	.90	.28	.04
¾	.35	.42	.50	1.00	.30	.06
1	.40	.50	.60	1.20	.40	.08
1¼	.55	.65	.80	1.60	.45	.09
1½	.70	.85	1.05	2.10	.55	.11
2	.90	1.10	1.35	2.70	.70	.15
2½	1.50	1.85	2.25	4.50	1.30	.27
3	2.40	2.85	3.60	7.20	2.25	.38
3½	3.25	4.00	5.00	10.00	....	.57
4	4.25	5.00	6.50	13.00	....	.63
5	6.50	....	9.75	19.50	....	1.35
6	9.50	....	14.25	28.50	....	1.80

*Cast iron.



Vogt Malleable Iron Ammonia Return Bends

Screw Ends

300 Pounds Working Pressure

No.	Size In.	Centers In.	Wt. Lbs.	Price Each	No.	Size In.	Centers In.	Wt. Lbs.	Price Each
349	1	1¾	1½	$.75	358	1½	3	4¾	$1.50
350	1	2½	2¼	.95	359	1½	6	8	2.25
351	1	3	2½	1.10	360	1½	8	9¾	2.60
352	1¼	2¼	3½	1.15	361	2	3	5	1.60
353	1¼	2½	3¾	1.25	362	2	3½	7¼	1.70
354	1¼	3	4	1.30	363	2	4	8¼	2.00
355	1¼	3½	5½	1.50	364	2	6	10¾	2.50
356	1¼	4	4¾	1.55	365	2	8	13¼	2.70
357	1¼	6	5¼	2.00	...	...	.	....	....

No. 272-E Crane Malleable Iron Return Bends for Ammonia

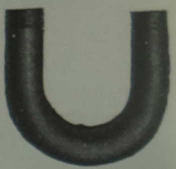
For 300 Pounds Steam or Oil Working Pressure at 500° F.
300 Pounds Ammonia Working Pressure

Size In.	Each	Center to Center In.	Size In.	Each	Center to Center In.	Size In.	Each	Center to Center In.
1	$.60	1¾	1¼	$1.20	4	2	$1.25	3
1	.75	2½	1¼	1.55	6	2	1.30	3½
1	.85	3	1½	1.05	2½	2	1.90	4
1¼	.90	2¼	1½	1.15	3	2	2.25	4⅝
1¼	.95	2½	1½	1.25	3½	2	3.25	6
1¼	1.00	3	1½	1.75	6	2	3.50	8
1¼	1.15	3½	1½	2.00	8	..	....	...

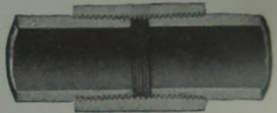
Wrought Steel Return Bends

Made from Extra Strong Pipe

Size In.	Each	C. to C. of Pipe, In.	Center to End, In.
½	$.90	4⅛	3½
¾	1.10	4½	3¾
1	1.25	4½	5
1¼	1.75	6	6
1½	2.75	8	8
2	4.00	8	8


No. 218

XX Hydraulic Couplings



Made extra heavy and long.

Cut with perfect taper and longer thread.

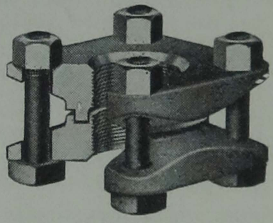
Threads for these couplings may be cut with an ordinary die.

The object of the recessed couplings is to make a better joint, protecting the pipe at the weak point, that part left exposed from cutting the thread and not covered with the ordinary couplings.

Size Inches	Outside Diameter Inches	Length Inches	Black Each	Recessed Black Each
¾	1.66	2$\frac{5}{16}$	$.40	$.50
1	1.90	2⅝	.55	.65
1¼	2.22	2⅞	.70	.85
1½	2.44	3⅛	.85	1.00
2	3.19	3⅜	1.15	1.30
2½	3.62	3⅝	1.60	1.85

No. 1589 Flange Unions for Ammonia

¼ to 3-Inch Working Pressures up to 300 Pounds at 500° F.
8 to 12-Inch Working Pressures up to 250 Pounds
¼ to 3-Inch, Forged Steel
3½ to 6-Inch, Malleable Iron
8 to 12-Inch, Ferrosteel

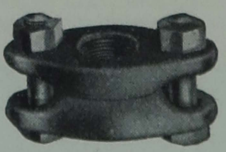

Square

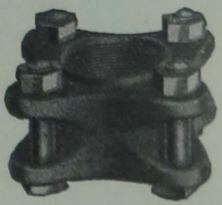
Size Inches	Price Each	Size Inches	Price Each
Oval			
¼	$.90	½	$1.20
⅜	1.00	¾	1.55
Square			
1	$2.15	2	$3.10
1¼	2.25	2½	5.50
1½	2.70	....	.....
Round			
3	$6.75	8	$20.00
3½	7.75	10	28.00
4	9.25	12	40.00
5	11.00	....	.....
6	13.75	....	.....

Drop Forged Steel Flange Unions

Ground Joint

2500 Pounds Cold Working Pressure


Oval


Square

Flange unions furnished unless otherwise specified. Price for flange union includes two flanges and necessary bolts. Carbon steel machine bolts regularly furnished.

Oval

No.	2391	2392	2393	2394	2395
Single Flange ... each	$.90	$.90	$1.10	$1.30	$1.70
Flange Union ... each	2.00	2.00	2.40	3.20	3.80
Nom. Pipe Size ... in.	¼	⅜	½	¾	1
Outside Size Flange ... in.	3¾	3¾	3¾	4¾	4¾
No. of Bolts	2	2	2	2	2

Square

No.	2396	2397	2398	2399
Single Flange ... each	$2.20	$2.70	$8.80	$15.00
Flange Union ... each	6.00	7.00	20.00	34.00
Nom. Pipe Size ... in.	1¼	1½	2	2½
Outside Size Flange ... in.	5⅝	5⅝	7$\frac{13}{16}$	8$\frac{13}{16}$
No. of Bolts	4	4	4	4

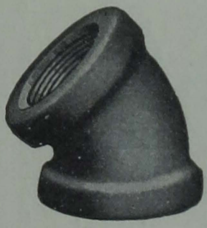
Drop Forged Steel Screwed Fittings

All of these fittings are bored out of solid forgings and tapped accurate to gauge, using the highest quality of high speed steel taps.

90° Elbows

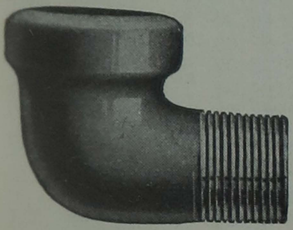
Size In.	For Cold Working Pressure 3000 Lbs. Each	6000 Lbs. Each
1/8	$.55	$.55
1/4	.55	.55
3/8	.55	.65
1/2	.65	.75
3/4	.75	.90
1	.90	1.20
1¼	1.20	1.50
1½	$1.50	$1.90
2	1.90	2.90
2½	2.90	5.00
3	5.00	12.50
3½	12.50	12.50
4	12.50	.....
6	38.50	.....

45° Elbows



Size In.	For Cold Working Pressure 3000 Lbs. Each	6000 Lbs. Each
1/8	$.68	$.68
1/4	.68	.68
3/8	.68	.78
1/2	.78	.90
3/4	.90	1.08
1	1.08	1.44
1¼	1.44	1.80
1½	$1.80	$2.28
2	2.28	3.48
2½	3.48	6.00
3	6.00	14.00
3½	14.00	14.00
4	14.00	.....
...	.....	.....

Street Elbows



Size In.	For 3000 Pounds Cold Working Pressure Each
1/4	$.75
3/8	.85
1/2	.85
3/4	1.05
1	1.40
1¼	2.00

Tees

Size Inches	For Cold Working Pressure 3000 Pounds Each	6000 Pounds Each
1/8	$.80	$.80
1/4	.80	.80
3/8	.80	.95
1/2	.95	1.10
3/4	1.10	1.35
1	1.35	1.75
1¼	1.75	2.30
1½	2.30	2.90
2	2.90	4.40
2½	4.40	7.50
3	7.50	17.00
3½	17.00	17.00
4	17.00	....
6	45.00	.....

Crosses

Size In.	For Cold Working Pressure 3000 Pounds Each	6000 Pounds Each
1/8	$1.10	$1.10
1/4	1.10	1.10
3/8	1.10	1.30
1/2	1.30	1.50
3/4	1.50	1.90
1	1.90	2.80
1¼	2.80	3.50
1½	3.50	5.00
2	5.00	7.30
2½	7.30	10.00
3	10.00	23.00
3½	23.00	23.00
4	23.00	.....

As the fittings are bored out of solid forgings, it is possible to furnish reducing sizes promptly. For reduced fittings, except street elbows, add 15 per cent extra.

Vogt Steel Plugs

Sizes 1/8 inch to 4 inches inclusive, square head. Machined from solid steel.

Size Inches	Each
1/8	$.25
1/4	.25
3/8	.25
1/2	.25
3/4	.30
1	$.35
1¼	.50
1½	.75
2	1.50
...	....
2½	$3.00
3	5.00
3½	5.75
4	6.50
...	.....

Vogt Steel Hexagon Bushings

Bushings are machined from solid steel.

Size Inches	Each
1/4x 1/8	$.45
1/2x 3/8	.45
3/4x 1/2 and Less	.45
1 x 3/4 and Less	.50
1¼x1 and Less	.66
1½x1¼ and Less	.83
2 x 3/4 and Less	1.20
2 x1 and More	1.32
2½x1¼ and Less	4.50
2½x1½ and More	$5.00
3 x1½ and Less	7.25
3 x2 and More	8.00
3½x1½ and Less	8.25
3½x2 and More	9.00
4 x1½ and Less	9.50
4 x2 and More	10.50
5 x4 and Less	12.50
6 x5 and Less	20.00

Vogt Steel Flush Bushings

Machined from solid steel.

Size, Inches	Each
1/4x 1/8	$.50
3/8x 1/4 and Less	.50
1/2x 3/8 and Less	.50
3/4x 1/2 and Less	.55
1 x 3/4 and Less	.60
1¼x1 and Less	.75
1½x1¼ and Less	.95
2 x1½ and Less	$1.50
2½x2 and Less	2.00
3 x2½ and Less	5.00
3½x3 and Less	6.00
4 x3½ and Less	7.50
5 x4 and Less	8.75
6 x5 and Less	10.00

Vogt Steel Couplings

Couplings are machined from solid steel.

Size Inches	Cold Working Pressure 3000 Lbs. Each	6000 Lbs. Each
1/8	$.40	$.60
1/4	.40	.60
3/8	.40	.60
1/2	.40	.60
3/4	.45	.65
1	.55	.85
1¼	.70	1.05
1½	$.85	$1.30
2	1.15	1.75
2½	1.60	2.40
3	2.75	4.75
3½	3.85	8.50
4	4.80	10.90
...	....	....

Prices on reducing couplings upon application.

Drop Forged
FITTINGS AND VALVES

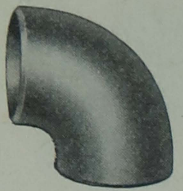
•

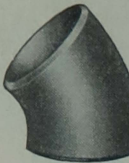
WE CAN FURNISH the complete line of the Henry Vogt Company's Forged Steel Valves and Screwed and Flanged Fittings. Catalog upon request.

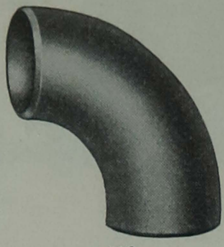
WE REPRESENT and stock the Taylor Pipe and Forge Company's Forged Steel Flanges, Nozzles and Welding Fittings. Special catalog will be sent on request.

Taylor Forge Standard Seamless Steel Pipe Fittings

Weldells


90°
Standard Radius


45°


90°
Long Radius

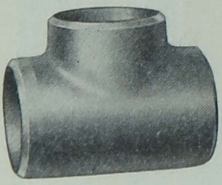
Nom. I. P. Size In.	Each	Center to End In.	Nom. O. D. In.	Nom. Wall Thick. In.	Nom. I. P. Size In.	Each	Center to End In.	Nom. O. D. In.	Nom. Wall. Thick. In.
90° Standard Radius									
2	$2.10	2½	2.375	.154	10	$53.40	8⅝	10.75	.365
2½	3.40	2 15/16	2.875	.203	12	80.70	10	12.75	.375
3	4.90	3⅜	3.500	.216	†14	120.00	14	14.00	.375
3½	6.35	3¾	4.000	.226	†16	175.00	15	16.00	.375
4	7.65	4⅛	4.500	.237	†18	235.00	16½	18.00	.375
5	10.85	4⅞	5.563	.258	†20	270.00	18	20.00	.375
6	15.80	5⅝	6.625	.280	†24	340.00	22	24.00	.375
8	30.00	7	8.625	.322	..	......	....	.....	....
***45°**									
¾	$.90	9/16	1.050	.113	6	$14.25	3¾	6.625	.280
1	1.08	⅝	1.315	.133	8	27.00	5	8.625	.322
1¼	1.26	¾	1.660	.140	10	48.00	6¼	10.750	.365
1½	1.53	⅞	1.900	.145	12	72.75	7½	12.750	.375
2	1.90	1½	2.375	.154	14	108.00	8¾	14.000	.375
2½	3.05	1¾	2.875	.203	16	158.00	7	16.000	.375
3	4.40	2	3.500	.216	18	212.00	7¾	18.000	.375
3½	5.70	2⅜	4.000	.226	20	245.00	8½	20.000	.375
4	6.90	2½	4.500	.237	24	315.00	10¼	24.000	.375
5	9.80	3⅛	5.563	.258	..	......	....	......	....
90° Long Radius									
¾	$1.00	1⅛	1.050	.113	4	$7.65	6	4.500	.237
1	1.20	1½	1.315	.133	5	10.85	7½	5.563	.258
1¼	1.40	1⅞	1.660	.140	6	15.80	9	6.625	.280
1½	1.70	2¼	1.900	.145	8	30.00	12	8.625	.322
2	2.10	3	2.375	.154	10	53.40	15	10.750	.365
2½	3.40	3¾	2.875	.203	12	80.70	18	12.750	.375
3	4.90	4½	3.500	.216	14	120.00	21	14.000	.375
3½	6.35	5¼	4.000	.226	..	......	..	......	....

Weldells can also be furnished made from Byers Genuine Wrought Iron Pipe.

†These fittings have the same center to face dimensions as the 150-pound Low Pressure Flanged Fitting Standard.

*Sizes 14-inch and smaller are of long radius design; sizes 16-inch and larger of standard radius.

Seamless Tees



Tees reducing in the run can be supplied by attaching reducing nipples to make the required reduction. Tees in sizes 1½ inches and smaller are forged solid and machined out.

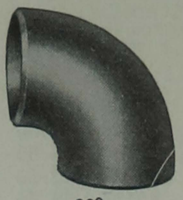
‡Wall thickness in the body and around the branch is greater than at the machined ends in order to provide proper reinforcement; full inside diameter is maintained.

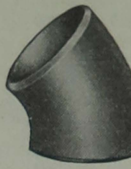
**Center to reduced end dimension varies somewhat depending on reduction.

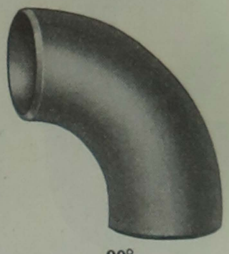
Nom. I. P. Size In.	**Straight** (Full Branch) Each	****Reducing** (Reducing in Branch) Each	Center to End In.	Nom. O. D. In.	Nom. I. D. In.	‡Nom. Wall Thick. In.	Approx. Wt. Lbs.
¾	$2.15	$2.70	1⅛	1.050	.824	.113	½
1	2.15	2.70	1½	1.315	1.049	.133	¾
1¼	2.90	3.60	1⅞	1.660	1.380	.140	1¼
1½	3.65	4.55	2¼	1.900	1.610	.145	1¾
2	5.00	6.25	2½	2.375	2.067	.154	3¼
2½	7.30	9.10	2 15/16	2.875	2.469	.203	5
3	9.50	11.85	3⅜	3.500	3.068	.216	7
3½	12.50	15.60	3¾	4.000	3.548	.226	8
4	13.00	16.25	4⅛	4.500	4.026	.237	12
5	24.00	30.00	4⅞	5.563	5.047	.258	20
6	28.00	35.00	5⅝	6.625	6.065	.280	30
8	45.00	56.25	7	8.625	7.981	.322	52

Taylor Forge Extra Heavy Seamless Steel Pipe Fittings for Welding

Weldells


90°
Standard Radius


45°


90°
Long Radius

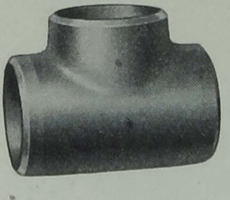
Nom. I. P. Size In.	Each	Center to End In.	Nom. O. D. In.	Nom. Wall Thick. In.	Nom. I. P. Size In.	Each	Center to End In.	Nom. O. D. In.	Nom. Wall Thick. In.
90° Standard Radius									
2	$2.65	2½	2.375	.218	10	$67.00	8⅝	10.75	.500
2½	4.25	2 15/16	2.875	.276	12	101.00	10	12.75	.500
3	6.15	3⅜	3.500	.300	†14	150.00	14	14.00	.500
3½	7.95	3¾	4.000	.318	†16	219.00	15	16.00	.500
4	9.55	4⅛	4.500	.337	†18	294.00	16½	18.00	.500
5	13.55	4⅞	5.563	.375	†20	340.00	18	20.00	.500
6	19.75	5⅝	6.625	.432	†24	410.00	22	24.00	.500
8	37.50	7	8.625	.500	..	......	..	.....	....
***45°**									
1	$1.35	⅝	1.315	.179	6	$17.80	3¾	6.625	.432
1¼	1.60	¾	1.660	.191	8	33.75	5	8.625	.500
1½	1.95	⅞	1.900	.200	10	60.50	6¼	10.750	.500
2	2.40	1½	2.375	.218	12	91.00	7½	12.750	.500
2½	3.80	1¾	2.875	.276	14	135.00	8¾	14.000	.500
3	5.55	2	3.500	.300	16	197.00	7	16.000	.500
3½	7.15	2⅜	4.000	.318	18	265.00	7¾	18.000	.500
4	8.60	2½	4.500	.337	20	310.00	8½	20.000	.500
5	12.20	3⅛	5.563	.375	..	......	...	......	....
90° Long Radius									
1	$1.50	1½	1.315	.179	4	$9.55	6	4.500	.337
1¼	1.75	1⅞	1.660	.191	5	13.55	7½	5.563	.375
1½	2.15	2¼	1.900	.200	6	19.75	9	6.625	.432
2	2.65	3	2.375	.218	8	37.50	12	8.625	.500
2½	4.25	3¾	2.875	.276	10	67.00	15	10.750	.500
3	6.15	4½	3.500	.300	12	101.00	18	12.750	.500
3½	7.95	5¼	4.000	.318	14	150.00	21	14.000	.500

Weldells can also be furnished made from Byers Genuine Wrought Iron Pipe.

†These fittings have the same center to face dimensions as the 150-Pound Low Pressure Flanged Fitting Standard.

*Sizes 14-inch and smaller are of long radius design; sizes 16-inch and larger of standard radius design.

Seamless Tees



Tees reducing in the run can be supplied by attaching reducing nipples to make the required reduction. Tees in sizes 1½ inches and smaller are forged solid and machined out.

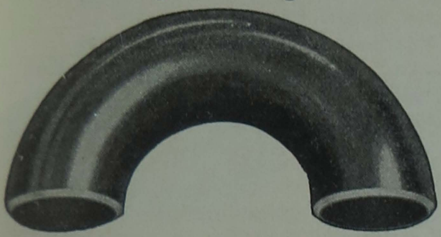
‡Wall thickness in the body and around the branch is greater than at the machined ends in order to provide proper reinforcement; full inside diameter is maintained.

**Center to reduced end dimension varies somewhat depending on reduction.

Nom. I. P. Size In.	**Straight** (Full Branch) Each	****Reducing** (Reducing in Branch) Each	Center to End In.	Nom. O. D. In.	Nom. I. D. In.	‡Nom. Wall Thick. In.	Approx. Wt. Lbs.
¾	$2.15	$2.70	1⅛	1.050	.742	.154	¾
1	2.15	2.70	1½	1.315	.957	.179	⅞
1¼	2.90	3.60	1⅞	1.660	1.278	.191	1⅜
1½	3.65	4.55	2¼	1.900	1.500	.200	2
2	5.00	6.25	2½	2.375	1.939	.218	3¾
2½	7.30	9.10	2 15/16	2.875	2.323	.276	5¾
3	12.00	15.00	3⅜	3.500	2.900	.300	8
3½	16.00	20.00	3¾	4.000	3.364	.318	9¼
4	17.00	21.25	4⅛	4.500	3.826	.337	13¾
5	30.00	37.50	4⅞	5.563	4.813	.375	23
6	35.00	43.75	5⅝	6.625	5.761	.432	34½
8	58.00	72.50	7	8.625	7.625	.500	60

Taylor Forge Return Bends

Seamless Steel



Standard weight bends are always used with standard weight pipe; extra heavy bends are always used with extra heavy weight pipe.

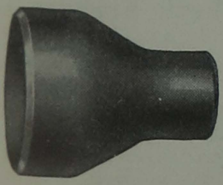
Standard Pipe Thickness

Nom. Pipe Size In.	Each	Center to Center In.	Nom. O.D. In.	Nom. I.D. In.	Nom. Wall Thick. In.	Back to Face In.	Approx. Wt. Lbs.
¾	$2.20	2¼	1.050	.824	.113	1 21/32	⅓
1	2.65	3	1.315	1.049	.133	2 5/32	½
1¼	3.10	3¾	1.660	1.380	.140	2 45/64	1
1½	3.75	4½	1.900	1.610	.145	3 13/64	1½
2	4.65	6	2.375	2.067	.154	4 3/16	2½
2½	7.50	7½	2.875	2.469	.203	5 3/16	5½
3	10.80	9	3.500	3.068	.216	6¼	8½
4	17.00	12	4.500	4.026	.237	8¼	16½
5	23.90	15	5.563	5.047	.258	10 9/32	28
6	34.80	18	6.625	6.065	.280	12 5/16	44
8	66.00	24	8.625	7.981	.322	16 5/16	89
10	117.50	30	10.750	10.020	.365	20⅜	158
12	177.50	36	12.750	12.000	.375	24⅜	230

Extra Heavy Pipe Thickness

Nom. Pipe Size In.	Each	Center to Center In.	Nom. O.D. In.	Nom. I.D. In.	Nom. Wall Thick. In.	Back to Face In.	Approx. Wt. Lbs.
1	$3.30	3	1.315	.957	.179	2 5/32	¾
1¼	3.85	3¾	1.660	1.278	.191	2 45/64	1½
1½	4.75	4½	1.900	1.500	.200	3 13/64	2
2	5.85	6	2.375	1.939	.218	4 3/16	4
2½	9.35	7½	2.875	2.323	.276	5 3/16	7½
3	13.55	9	3.500	2.900	.300	6¼	12
4	21.00	12	4.500	3.364	.337	8¼	23½
5	29.70	15	5.563	4.813	.375	10 9/32	41
6	43.50	18	6.625	5.761	.432	12 5/16	67
8	82.50	24	8.625	7.625	.500	16 5/16	136
10	147.40	30	10.750	9.750	.500	20⅜	215
12	222.20	36	12.750	11.750	.500	24⅜	303

Taylor Forge Seamless Steel Reducing Nipples



Ends beveled for welding, not threaded. Lengths and weights, upon application.

Nominal I. P. Size Inches	Standard Each	Extra Heavy Each	Nominal I. P. Size Inches	Standard Each	Extra Heavy Each
1 x ¾	$1.50	$2.75	5x 2½	$6.50	$11.50
1¼x1	2.00	3.50	5x 2	6.50	11.50
1¼x ¾	2.00	3.50	6x 5	8.00	14.00
1½x1¼	2.00	3.50	6x 4	8.00	14.00
1½x1	2.00	3.50	6x3½	9.00	15.75
1½x ¾	2.50	4.50	6x 3	9.00	15.75
2 x1½	2.25	3.75	6x 2½	9.00	15.75
2 x1¼	2.25	3.75	8x 6	12.00	26.25
2 x1	2.25	3.75	8x 5	15.00	30.60
2 x ¾	2.75	4.75	8x 4	15.00	30.60
2½x2	2.50	4.50	8x 3½	15.00	30.60
2½x1½	2.75	5.00	8x 3	18.00	35.00
2½x1¼	2.75	5.00	10x 8	18.00	40.00
2½x1	2.75	5.00	10x 6	20.00	44.00
3 x2½	3.00	5.25	10x 5	26.00	48.00
3 x2	3.00	5.25	10x 4	26.00	48.00
3 x1½	3.25	5.70	12x10	32.00	56.00
3 x1¼	3.25	5.70	12x 8	36.00	63.00
3 x1	3.25	5.70	12x 6	36.00	63.00
3½ x3	3.50	6.00	12x 5	40.00	70.00
3½ x2½	3.50	6.00	12x 4	40.00	70.00
3½ x2	3.50	6.00	14x12	40.00	70.00
3½ x1½	3.75	6.50	14x10	40.00	70.00
4 x3½	4.00	7.00	16x14	70.00	105.00
4 x3	4.00	7.00	16x12	70.00	105.00
4 x2½	4.00	7.00	18x16	85.00	148.00
4 x2	4.00	7.00	18x14	85.00	148.00
4 x1½	4.50	8.00	18x12	95.00	166.00
4 x1¼	4.50	8.00	20x18	90.00	157.50
4 x1	4.50	8.00	20x16	90.00	157.50
5 x4	6.00	10.50	20x14	100.00	175.00
5 x3½	6.50	11.50	20x12	100.00	175.00
5 x3	6.50	11.50	.....	......	......

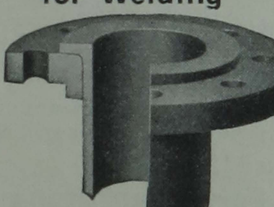
Taylor Forge Seamless Steel Welding Caps

Ellipsoidal in Shape—2 to 1 Axis Ratio

Standard weight caps are always used with standard weight pipe; extra heavy with extra heavy pipe.

Nom. I. P. Size In.	Standard			Extra Heavy			Nom. O. D. In.	Over-all Lgth. In.
	Each	Nom. Wall Thick. In.	Approx. Wt. Lbs.	Each	Nom. Wall Thick. In.	Approx. Wt. Lbs.		
1	$1.70	.133	½	$2.10	.179	⅝	1.315	2
1¼	1.70	.140	⅝	2.10	.191	⅞	1.660	2
1½	1.70	.145	1	2.10	.200	1⅜	1.900	2
2	1.85	.154	1½	2.25	.218	1½	2.375	2
2½	2.00	.203	1½	2.50	.276	2	2.875	2¼
3	2.40	.216	2½	3.30	.300	3	3.500	3
3½	3.20	.226	3	4.25	.318	4	4.000	3⅛
4	3.70	.237	3½	4.90	.337	4½	4.500	3¼
5	4.90	.258	5	5.85	.375	6½	5.563	3½
6	5.95	.280	8	7.50	.432	9½	6.625	3 13/16
8	10.10	.322	12	12.20	.500	15	8.625	4 5/16
10	14.60	.365	21	18.50	.500	26	10.750	5⅜
12	20.85	.375	31	25.00	.500	40	12.750	6⅜
14	24.00	.375	38	30.00	.500	50	14.000	7
16	28.00	.375	50	34.50	.500	66	16.000	8
18	32.00	.375	63	38.50	.500	84	18.000	9
20	35.50	.375	79	45.00	.500	109	20.000	10
24	41.75	.375	115	49.00	.500	152	24.000	12

Taylor Forge Van Stone Stub Ends for Welding



Upset from wrought steel pipe. With full thickness, square corner, machined, Van Stone Lap. Plain end machine-tool beveled for welding; complete with flange protectors.

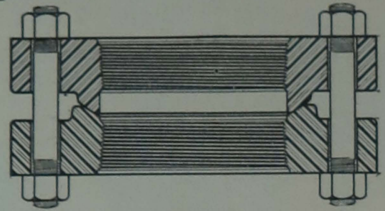
Furnished with or without forged steel flange, faced, drilled and spot-faced.

Nom. I.P. Size In.	Standard Weight			Extra Heavy Weight		Length Over All In.
	Stub Only Each	With Series 15 Flange Each	With Series 30 Flange Each	Stub Only Each	With Series 30 Flange Each	
1½	$4.45	$6.20	$7.85	$4.70	$8.25	6
2	5.75	7.35	9.00	6.25	9.40	6
2½	6.50	9.10	10.40	7.15	11.00	6
3	7.30	10.00	11.80	8.25	12.60	6
3½	8.10	12.00	14.20	9.40	15.20	6
4	9.30	12.85	15.40	10.90	16.80	6
5	10.75	15.60	18.40	13.50	20.60	8
6	12.75	18.10	21.00	16.35	24.00	8
8	16.00	25.75	32.00	24.00	39.20	8
10	22.75	36.40	44.60	35.75	56.00	10
12	30.75	47.20	59.20	48.75	73.00	10

In our Engineering Department, as a part of our Service, there is a corps of experienced and highly trained specialists whose duty it is to assist customers when such help is desired.

Taylor Forge Ground Joint Flange Unions

Forged Steel—With Alloy Stud Bolts



Nominal Pipe Size Inches	400 Pound Each	600 Pound Each	900 Pound Each	1350 Pound Each
1	$21.50	......	$26.00	......
1¼	24.00	......	27.50	......
1½	27.00	......	30.50	......
2	30.50	......	34.50	......
2½	34.00	......	40.00	......
3	38.50	......	46.00	$65.00
3½	43.00	......	53.00	
4	49.00	$57.00	72.00	105.00
5	59.00	68.00	107.00	......
6	76.00	92.00	135.00	190.00
8	110.00	130.00	202.00	......
10	155.00	190.00	310.00	......
12	220.00	272.00	400.00	......

Pressure-Temperature Rating

400-POUND FLANGE UNIONS.—Steam or hot oil, 400 lbs. per sq. in., 750° F.; cold water, oil or gas, 1000 lbs per. sq. in atmospheric temp., no shock.

600-POUND FLANGE UNIONS.—Steam or hot oil 600 lbs. per sq. in., 750° F.; cold water, oil or gas, 1500 lbs. per sq. in. atmospheric temp., no shock.

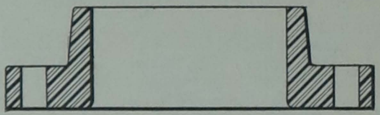
900-POUND FLANGE UNIONS.—Steam or hot oil, 900 lbs. per sq. in., 750° F.; cold water, oil or gas, 2500 lbs. per sq. in. atmospheric temp., no shock.

1350-POUND FLANGE UNIONS.—Steam or hot oil, 1350 lbs. per sq. in., 750° F.; cold water, oil or gas, 3000 lbs. per sq. in. atmospheric temp., no shock.

Taylor Forge Van Stone Flanges

Forged Steel

American Standard

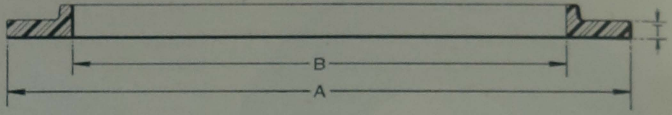


Faced, bored, radiused, drilled, spot or back-faced.

Nominal Pipe Size Inches	*150 Pound Each	*300 Pound Each	†400 Pound Each	†600 Pound Each	†900 Pound Each	†1500 Pound Each
½	$8.00	$8.00	......	$9.50	......	$14.00
¾	8.00	8.00	......	9.50	......	14.00
1	8.00	8.00	......	10.00	......	14.00
1¼	9.00	9.00	......	10.75	......	14.00
1½	10.00	10.00	......	11.75	......	16.00
2	11.00	11.00	......	13.00	......	22.00
2½	13.00	13.00	......	15.00	......	29.00
3	15.00	15.00	......	18.50	$29.00	38.00
3½	19.00	19.00	......	22.50	......	......
4	20.00	20.00	$20.00	33.00	51.00	60.00
5	24.00	24.00	24.00	46.00	71.00	105.00
6	27.00	27.00	27.00	55.00	86.00	132.00
8	35.00	35.00	35.00	80.00	155.00	220.00
10	48.00	48.00	48.00	125.00	225.00	365.00
12	60.00	60.00	60.00	150.00	300.00	550.00
14	80.00	80.00	80.00	180.00	380.00	......
16	100.00	100.00	100.00	240.00	460.00	......
18	125.00	125.00	125.00	300.00	650.00	......
20	150.00	150.00	150.00	360.00	795.00	......
24	240.00	240.00	240.00	540.00	1500.00	......

*Raised face, $\frac{1}{16}$ inch. †Raised face, ¼ inch.

Taylor Forge Standard Flanges



Forged and rolled steel for attaching by slipping over lightweight pipe and welding.

Nom. Pipe Size In.	Black Attached Each	Black Loose Each	Galvanized Attached Each	Galvanized Loose Each	Drilling Template No. of Bolts	Drilling Template Diam. and Length of Bolts	Drilling Template Diam. of Bolt Circle
3	$1.80	$1.20	$2.00	$1.40	4	½x1½	4¾
4	2.00	1.40	2.40	1.80	8	½x1½	5$\frac{15}{16}$
5	2.40	1.80	2.80	2.20	8	½x1½	6$\frac{15}{16}$
6	2.80	1.90	3.30	2.40	8	½x1¾	7⅞
8	3.80	2.30	4.50	3.00	8	½x1¾	10
10	4.60	2.80	5.60	3.80	12	⅝x2	12¼
12	5.60	3.40	6.60	4.40	12	⅝x2	14¼
14	8.00	5.60	9.60	7.20	12	⅝x2¼	16¼
16	12.00	9.40	14.60	12.00	16	⅝x2¼	19¼
18	16.00	13.00	19.00	16.00	16	⅝x2¼	21¼
20	18.00	14.60	23.40	20.00	20	⅝x2¼	23⅛
22	24.00	20.20	28.20	24.40	20	⅝x2¼	26
24	28.00	24.00	33.20	29.20	20	⅝x2½	27¾
26	30.00	25.60	35.30	30.90	24	¾x2½	29¾
28	32.00	27.20	37.80	33.00	28	¾x2½	31¾
30	34.00	28.80	40.00	34.80	28	¾x2½	33¾
32	36.00	30.60	42.40	37.00	28	¾x2½	35¾
34	38.00	32.20	44.60	38.80	32	¾x2½	37¾
36	40.00	34.00	47.20	41.20	32	¾x2½	39¾
38	42.00	35.00	49.60	42.60	32	¾x2½	41¾
40	46.00	38.00	54.00	46.00	36	¾x2½	43¾
42	50.00	41.00	59.00	50.00	36	¾x2½	45¾
44	.....	43.00	.....	.....	40	¾x2½	47¾
46	.....	45.00	.....	.....	40	¾x2½	49¾
48	.....	47.00	.....	.....	44	¾x2½	51¾

Taylor Forge Welding Neck Flanges

Forged Steel

Flanges are furnished faced, drilled, bored and spot-faced or back-faced and with hubs machine beveled for butt welding.

American Standard, 150 and 300-pound are carried in stock in standard bore only. Also furnished bored for extra heavy pipe when so specified. American Standard, 600, 900 and 1500-pound are not carried in stock bored. Bore must be specified.

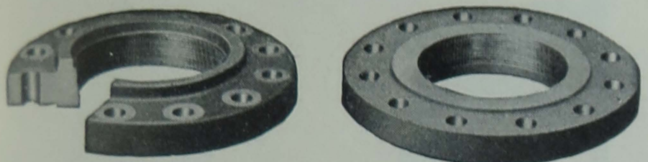
Nominal Pipe Size Inches	American Standard *150 Pound Each	*300 Pound Each	†**400 Pound Each	†600 Pound Each	‡†900 Pound Each	§†1500 Pound Each
½	$11.00	$11.00	.....	$16.30	.....	$27.00
¾	11.00	11.00	.....	16.30	.....	27.00
1	11.00	11.00	.....	16.30	.....	27.00
1¼	11.00	11.00	.....	16.30	.....	27.00
1½	11.00	11.00	.....	16.30	.....	27.00
2	11.00	11.00	.....	16.30	.....	27.00
2½	13.00	13.00	.....	19.00	.....	35.00
3	15.00	15.00	.....	23.00	$35.00	46.00
3½	19.00	19.00	.....	29.00	.....	.....
4	20.00	20.00	$20.00	39.00	62.00	72.00
5	24.00	24.00	24.00	53.50	85.00	125.00
6	27.00	27.00	27.00	63.50	104.00	160.00
8	44.00	44.00	44.00	90.00	190.00	265.00
10	62.00	62.00	62.00	138.00	270.00	440.00
12	96.00	96.00	96.00	188.00	360.00	660.00
14	130.00	130.00	130.00	200.00	560.00	......
16	165.00	165.00	165.00	270.00	690.00	......
18	220.00	220.00	220.00	330.00	925.00	......
20	290.00	290.00	290.00	400.00	1160.00	......
24	380.00	380.00	380.00	590.00	2100.00	......

*Raised face $\frac{1}{16}$ in. high. †Raised face ¼ in. high.
**For sizes 3½-inch and smaller, use 600-pound standard.
‡For sizes 2½-inch and smaller, use 1500-pound standard.
§For sizes 14-inch and larger, prices upon application.

Taylor Forge Companion Flanges

Forged Steel

Screwed or Slip-On Welding Type



Companion flanges are furnished faced, drilled and spot-faced or back-faced.

Nominal Pipe Size Inches	American Standard *150 Pound Each	*300 Pound Each	†**400 Pound Each	†600 Pound Each	†‡900 Pound Each	§†1500 Pound Each
½	$8.00	$8.00	.....	$9.50	.....	$14.00
¾	8.00	8.00	.....	9.50	.....	14.00
1	8.00	8.00	.....	10.00	.....	14.00
1¼	9.00	9.00	.....	10.75	.....	14.00
1½	10.00	10.00	.....	11.75	.....	16.00
2	11.00	11.00	.....	13.00	.....	22.00
2½	13.00	13.00	.....	15.00	.....	29.00
3	15.00	15.00	.....	18.50	$29.00	38.00
3½	19.00	19.00	.....	22.50	.....	.....
4	20.00	20.00	$20.00	33.00	51.00	60.00
5	24.00	24.00	24.00	46.00	71.00	105.00
6	27.00	27.00	27.00	55.00	86.00	132.00
8	35.00	35.00	35.00	80.00	155.00	220.00
10	48.00	48.00	48.00	125.00	225.00	365.00
12	60.00	60.00	60.00	150.00	300.00	550.00
14	80.00	80.00	80.00	180.00	380.00	.....
16	100.00	100.00	100.00	240.00	460.00	.....
18	125.00	125.00	125.00	300.00	650.00	.....
20	150.00	150.00	150.00	360.00	795.00	.....
24	240.00	240.00	240.00	540.00	1500.00	.....

*With raised face 1/16 inch high.
†With raised face ¼ inch high.
**For sizes 3½-inch and smaller, use 600-pound standard.
‡For sizes 2½-inch and smaller, use 1500-pound standard.
§For sizes 14-inch and larger, prices upon application.

Taylor Forge Blind Flanges

Forged Steel

Blind flanges are furnished faced, drilled, and spot-faced or back-faced.

Nominal Pipe Size Inches	American Standard *150 Pound Each	*300 Pound Each	†**400 Pound Each	†600 Pound Each	†‡900 Pound Each	§†1500 Pound Each
½	$11.50	$11.50	.....	$11.50	.....	$17.00
¾	11.50	11.50	.....	11.50	.....	17.00
1	11.50	11.50	.....	11.50	.....	17.00
1¼	11.50	11.50	.....	11.50	.....	17.00
1½	11.50	11.50	.....	11.50	.....	19.00
2	12.60	12.60	.....	12.60	.....	27.00
2½	14.70	14.70	.....	14.70	.....	35.00
3	17.05	17.05	.....	17.05	$35.00	46.00
3½	21.65	21.65	.....	21.65	.....	.....
4	23.70	23.70	$23.70	40.00	62.00	72.00
5	28.20	28.20	28.20	56.00	85.00	125.00
6	31.60	31.60	31.60	66.00	104.00	160.00
8	42.00	42.00	42.00	96.00	190.00	265.00
10	58.00	58.00	58.00	150.00	270.00	440.00
12	76.00	76.00	76.00	180.00	360.00	660.00
14	126.00	126.00	126.00	216.00	455.00	.....
16	147.00	147.00	147.00	288.00	555.00	.....
18	210.00	210.00	210.00	360.00	780.00	.....
20	252.00	252.00	252.00	432.00	955.00	.....
24	320.00	320.00	320.00	648.00	1800.00	.....

*With raised face 1/16 inch high.
†With raised face ¼ inch high.
**For sizes 3½-inch and smaller, use 600-pound standard.
‡For sizes 2½-inch and smaller, use 1500-pound standard.
§For sizes 14-inch and larger, prices upon application.

Taylor Forge Alloy Steel Studs

With 2 Hexagonal Nuts

Continuous Threaded or Threaded Each End

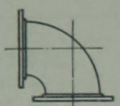
Per 100 Pieces

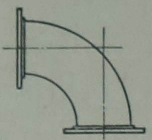
Length Inches	Diameter, Inches ½	⅝	¾	⅞
3	$25.85	$30.70	$39.50	$50.30
3¼	26.40	31.45	40.55	51.70
3½	26.95	32.20	41.60	53.10
3¾	27.50	32.95	42.65	54.50
4	28.05	33.70	43.70	55.90
4¼	28.60	34.45	44.75	57.30
4½	29.15	35.20	45.80	58.70
4¾	29.70	35.95	46.85	60.10
5	30.25	36.70	47.90	61.50
5¼	30.80	37.45	48.95	62.90
5½	31.35	38.20	50.00	64.30
5¾	31.90	38.95	51.05	65.70
6	32.45	39.70	52.10	67.10
6¼	33.00	40.45	53.15	68.50
6½	33.55	41.20	54.20	69.90
6¾	34.10	41.95	55.25	71.30
7	34.65	42.70	56.30	72.70
7¼	35.20	43.45	57.35	74.10
7½	35.75	44.20	58.40	75.50
7¾	36.30	44.95	59.45	76.90
8	36.85	45.70	60.50	78.30
8¼	.....	.....	61.50	79.70
8½	.....	.....	62.60	81.10
8¾	.....	.....	63.65	82.50
9	.....	.....	64.70	83.90

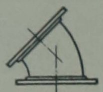
Length Inches	Diameter, Inches 1	1⅛	1¼	1⅜	1½
4	$69.00	......	......	......	......
4¼	70.70	......	......	......	......
4½	72.40	......	......	......	......
4¾	74.10	......	......	......	......
5	75.80	$103.30	......	......	......
5¼	77.50	105.40	......	......	......
5½	79.20	107.50	......	......	......
5¾	80.90	109.60	......	......	......
6	82.60	111.70	$141.70	......	......
6¼	84.30	113.80	144.20	......	......
6½	86.00	115.90	146.70	......	......
6¾	87.70	118.00	149.20	......	......
7	89.40	120.10	151.70	$188.70	......
7¼	91.10	122.20	154.20	191.70	......
7½	92.80	124.30	156.70	194.70	......
7¾	94.50	126.40	159.20	197.70	......
8	96.20	128.50	161.70	200.70	$243.30
8¼	97.90	130.60	164.20	203.70	246.90
8½	99.60	132.70	166.70	206.70	250.50
8¾	101.30	134.80	169.20	209.70	254.10
9	103.00	136.90	171.70	212.70	257.70
9¼	104.70	139.00	174.20	215.70	261.30
9½	106.40	141.10	176.70	218.70	264.90
9¾	108.10	143.20	179.20	221.70	268.50
10	109.80	145.30	181.70	224.70	272.10
10¼	......	147.40	184.20	227.70	275.70
10½	......	149.50	186.70	230.70	279.30
10¾	......	151.60	189.20	233.70	282.90
11	......	153.70	191.70	236.70	286.50
11¼	......	......	194.20	239.70	290.10
11½	......	......	196.70	242.70	293.70
11¾	......	......	199.20	245.70	297.30
12	......	......	201.70	248.70	300.90

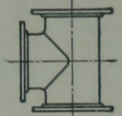
Flanged Fittings for Spiral Riveted Pipe

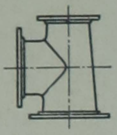
No. 10 Gage Thickness (.1406 Inch)

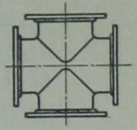

90°
Elbow

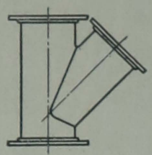

90° Long
Radius Elbow

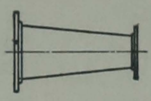

45°
Elbow


Tee


Reducing
Tee


Cross


Lateral


Reducer

With Standard Flanges Attached

Nom.	90° Elbows		90° Long Radius Elbows		45° Elbows		Tees	
I.D. In.	Black Each	Galv. Each	Black Each	Galv. Each	Black Each	Galv. Each	Black Each	Galv. Each
3	$6.00	$6.80	.....	.....	$6.00	$6.80	$8.70	$10.90
4	8.00	9.00	.....	.....	8.00	9.00	10.10	13.00
5	9.00	10.60	.....	.....	9.00	10.60	11.80	14.60
6	10.00	11.90	$13.50	$15.90	10.00	11.90	13.00	16.00
8	13.00	15.80	18.00	21.50	13.00	15.80	17.00	20.00
10	20.00	24.00	26.00	31.00	20.00	24.00	25.00	30.00
12	24.00	29.00	33.00	39.20	24.00	29.00	29.00	35.00
14	32.00	39.00	43.00	52.00	32.00	39.00	41.00	50.00
16	44.00	54.00	55.00	70.00	44.00	54.00	71.00	86.00
18	79.00	97.00	90.00	110.00	61.00	75.00	97.00	118.00
20	90.00	108.00	100.00	125.00	70.00	85.00	108.00	130.00
22	100.00	125.00	115.00	140.00	80.00	98.00	125.00	150.00
24	120.00	145.00	135.00	160.00	90.00	110.00	142.00	175.00

With Flanges of American Standard Diameter and Drilling Attached

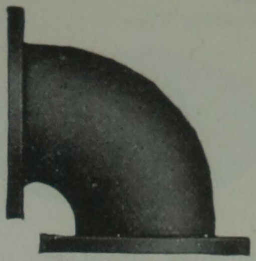
3	$7.00	$8.40	......	......	$7.00	$8.40	$10.20	$13.30
4	9.00	10.70	......	......	9.00	10.70	11.60	15.50
5	11.00	13.40	......	......	11.00	13.40	14.80	17.30
6	12.00	14.60	$15.50	$19.00	12.00	14.60	16.00	20.00
8	16.00	20.40	21.00	26.00	16.00	20.40	21.50	27.00
10	24.00	30.00	30.00	37.00	24.00	30.00	29.50	39.00
12	30.00	39.00	39.00	49.00	30.00	39.00	38.00	50.00
14	38.00	49.00	49.00	62.00	38.00	49.00	50.00	65.00
16	50.00	64.00	61.00	80.00	50.00	64.00	80.00	101.00
18	86.00	108.00	97.00	121.00	86.00	108.00	110.00	135.00
20	97.00	119.00	107.00	137.00	97.00	119.00	121.00	147.00
22	108.00	137.00	123.00	152.00	108.00	137.00	138.00	168.00
24	128.00	157.00	143.00	172.00	128.00	157.00	155.00	193.00

All fittings sizes 16-inch and smaller are made from No. 10 gage steel material. Sizes 18-inch and larger furnished of a thickness suitable for specific working requirements. Elbows, sizes 16-inch and smaller (14-inch and smaller in long radius type), are made in two halves with two longitudinal welds; sizes 18-inch and larger are of segmentally welded construction, the 90 degree elbows being made with five segments and the 45 degree elbows with three segments.

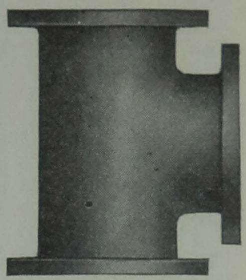
Center to face dimensions of all fittings are the same as the 125-pound American Standard for cast iron.

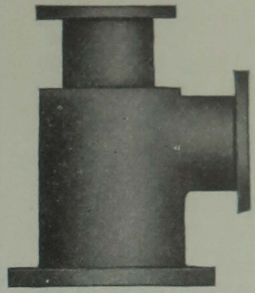
For reducing tees, crosses, laterals and reducers, prices upon application.

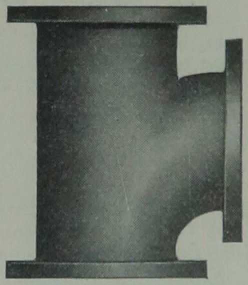
Cast Iron Flanged Fittings

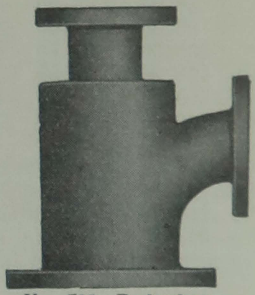

No. 500, Elbow

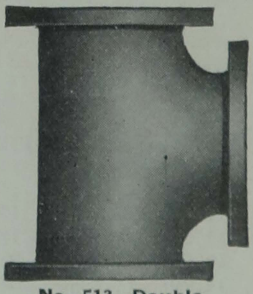
No. 501, 45° Elbow

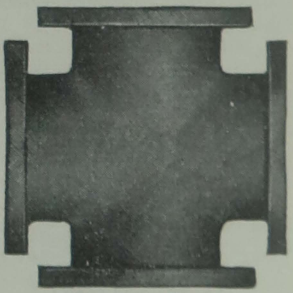

No. 509, Tee

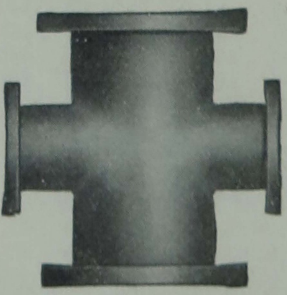

No. 510, Reducing Tee

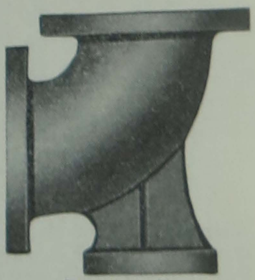

No. 511, Single Sweep Tee


No. 512, Reducing Single Sweep Tee


No. 513, Double Sweep Tee


No. 517, Cross


No. 518, Reducing Cross


No. 504, Base Elbow

Standard Cast Iron Flanged Fittings

125 Pounds Steam Working Pressure

Tees

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	$4.35	$5.25	6	$11.00	$12.95
1¼	4.35	5.25	8	17.40	19.80
1½	4.35	5.25	10	27.50	31.50
2	4.35	5.25	12	40.50	45.00
2½	4.55	5.45	14	60.00	65.50
3	5.00	6.10	16	79.00	86.50
3½	5.85	7.10	18	103.00	112.00
4	6.50	8.00	20	130.00	140.00
5	9.10	10.60	24	203.00	218.00

Reducing Tees

1¼	$5.00	$5.90	8	$20.00	$22.40
1½	5.00	5.90	10	31.50	35.50
2	5.00	5.90	12	46.50	51.00
2½	5.25	6.15	14	69.00	74.50
3	5.75	6.85	16	91.00	98.50
3½	6.75	8.00	18	118.00	127.00
4	7.50	9.00	20	150.00	160.00
5	10.50	12.00	24	233.00	248.00
6	12.65	14.60	..	......	......

Crosses and Laterals

1	*$6.75	*$7.95	6	$16.75	$19.25
1¼	*6.75	*7.95	8	26.50	29.75
1½	*6.75	*7.95	10	42.00	47.50
2	6.75	7.95	12	61.50	67.50
2½	6.95	8.15	14	91.00	98.50
3	7.65	9.05	16	120.00	130.00
3½	9.00	10.70	18	157.00	169.00
4	10.00	12.00	20	198.00	212.00
5	13.75	15.75	24	310.00	330.00

*Crosses only.

Reducing Crosses and Laterals

1¼	*$7.75	*$8.95	8	$30.50	$33.75
1½	*7.75	*8.95	10	48.00	53.50
2	*7.75	*8.95	12	71.00	77.00
2½	8.00	9.20	14	105.00	112.50
3	8.75	10.15	16	138.00	148.00
3½	10.35	12.05	18	180.00	192.00
4	11.50	13.50	20	228.00	242.00
5	15.75	17.75	24	355.00	375.00
6	19.25	21.75	..	......	......

*Crosses Only.

Single and Double Sweep Tees

2	$5.00	$5.90	6	$12.65	$14.60
2½	5.25	6.15	8	20.00	22.40
3	5.75	6.85	10	31.50	35.50
3½	6.75	8.00	12	46.50	51.00
4	7.50	9.00	14	69.00	74.50
5	10.50	12.00	16	91.00	98.50

Reducing Single and Double Sweep Tees

2½	$6.00	$6.90	8	$23.00	$25.40
3	6.60	7.70	10	36.00	40.00
3½	7.75	9.00	12	53.50	58.00
4	8.65	10.15	14	79.00	84.50
5	12.00	13.50	16	105.00	112.50
6	14.50	16.45	..	......	......

All square turn and sweep pattern tees and crosses have same dimensions. Single sweep tees not made with outlet larger than run. All flanged fittings will always be furnished faced only, unless otherwise ordered.

Standard Cast Iron Flanged Fittings

125 Pounds Steam Working Pressure

90° Elbows

Size In.	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	$3.00	$3.60	6	$7.60	$8.90
1¼	3.00	3.60	8	12.00	13.60
1½	3.00	3.60	10	19.00	21.70
2	3.00	3.60	12	28.00	31.00
2½	3.15	3.75	14	41.50	45.25
3	3.45	4.15	16	54.50	59.50
3½	4.05	4.90	18	71.00	77.00
4	4.50	5.50	20	90.00	97.00
5	6.25	7.25	24	140.00	150.00

45° Elbows

1	$3.30	$3.90	6	$8.35	$9.65
1¼	3.30	3.90	8	12.60	14.20
1½	3.30	3.90	10	20.00	22.70
2	3.30	3.90	12	29.50	32.50
2½	3.50	4.10	14	41.50	45.25
3	3.80	4.50	16	54.50	59.50
3½	4.50	5.35	18	71.00	77.00
4	5.00	6.00	20	90.00	97.00
5	6.90	7.90	24	140.00	150.00

Reducing Elbows

1½	$6.00	$6.60	8	$24.00	$25.60
2	6.00	6.60	10	38.00	40.70
2½	6.30	6.90	12	56.00	59.00
3	6.90	7.60	14	70.00	73.75
3½	8.10	8.95	16	90.00	95.00
4	9.00	10.00	18	105.00	111.00
5	12.50	13.50	20	120.00	127.00
6	15.25	16.55	24	187.00	197.00

Flanged taper reducing elbows not listed made to order at special price.

Long Radius Elbows

1	$5.00	$5.90	6	$12.65	$14.60
1¼	5.00	5.90	8	20.00	22.40
1½	5.00	5.90	10	31.50	35.50
2	5.00	5.90	12	46.50	51.00
2½	5.25	6.15	14	69.00	74.50
3	5.75	6.85	16	91.00	98.50
3½	6.75	8.00	18	118.00	127.00
4	7.50	9.00	20	150.00	160.00
5	10.50	12.00	24	235.00	250.00

Base Elbows

Size In.	Faced Only Each	Faced and Drilled Each	Facing and Drilling Base Flanges Each	Size In.	Faced Only Each	Faced and Drilled Each	Facing and Drilling Base Flanges Each
4	$9.00	$10.00	$3.00	14	$70.00	$73.75	$7.50
5	12.50	13.50	3.50	16	90.00	95.00	7.50
6	15.25	16.55	3.50	18	105.00	111.00	12.00
8	24.00	25.60	5.00	20	120.00	127.00	12.00
10	38.00	40.70	5.00	24	190.00	200.00	12.00
12	56.00	59.00	7.50	..	......	......	.....

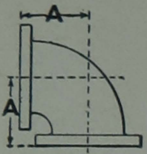
Reducers

Size In.	Faced Only Each	Faced and Drilled Each	Size In.	Faced Only Each	Faced and Drilled Each
2	$6.00	$6.60	10	$38.00	$40.70
2½	6.30	6.90	12	56.00	59.00
3	6.90	7.60	14	70.00	73.75
3½	8.10	8.95	16	90.00	95.00
4	9.00	10.00	18	105.00	111.00
5	12.50	13.50	20	120.00	127.00
6	15.25	16.55	24	190.00	200.00
8	24.00	25.60	..	......	......

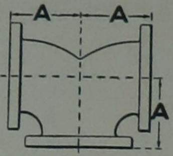
All flanged fittings will always be furnished faced only unless otherwise ordered.

General Dimensions of Standard and Low Pressure Cast Iron Flanged Fittings

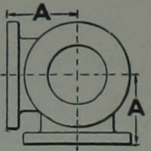
American Standard, Straight Sizes



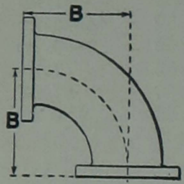
Ell



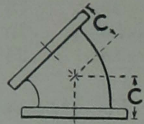
Double Branch Ell



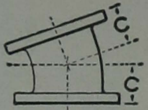
Side Outlet Ell



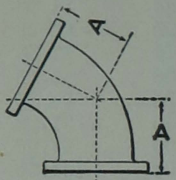
Long Radius Ell



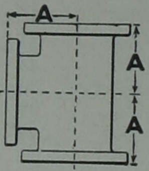
45° Ell



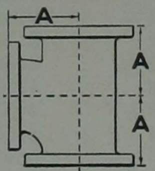
1° to 45° Ell



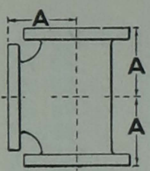
46° to 90° Ell



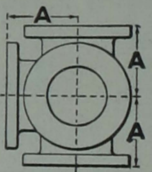
Tee



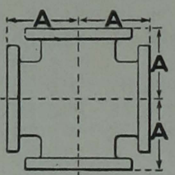
Single Sweep Tee



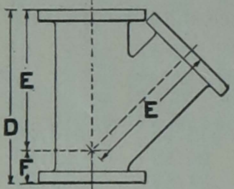
Double Sweep Tee



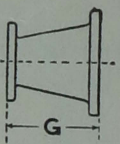
Side Outlet Tee



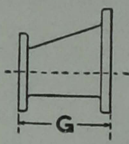
Cross



Lateral



Reducer



Eccentric Reducer

Dimensions, Inches

Size In.	AA Face to Face Tees and Crosses	Center to Face: *A Elbows Tees and Crosses	Center to Face: B Long Radius Elbows	Center to Face: *C 45° Elbows	45° Laterals: D Face to Face	45° Laterals: E Center to Face	45° Laterals: F Center to Face	G Face to Face Reducers	Flanges: Diam.	Flanges: Thickness
1	7	3½	5	1¾	7½	5¾	1¾	...	4¼	7/16
1¼	7½	3¾	5½	2	8	6¼	1¾	...	4⅝	½
1½	8	4	6	2¼	9	7	2	...	5	9/16
2	9	4½	6½	2½	10½	8	2½	5	6	⅝
2½	10	5	7	3	12	9½	2½	5½	7	11/16
3	11	5½	7¾	3	13	10	3	6	7½	¾
3½	12	6	8½	3½	14½	11½	3	6½	8½	13/16
4	13	6½	9	4	15	12	3	7	9	15/16
5	15	7½	10¼	4½	17	13½	3½	8	10	15/16
6	16	8	11½	5	18	14½	3½	9	11	1
8	18	9	14	5½	22	17½	4½	11	13½	1⅛
10	22	11	16½	6½	25½	20½	5	12	16	1 3/16
12	24	12	19	7½	30	24½	5½	14	19	1¼
14	28	14	21½	7½	33	27	6	16	21	1⅜
16	30	15	24	8	36½	30	6½	18	23½	1 7/16
18	33	16½	26½	8½	39	32	7	19	25	1 9/16
20	36	18	29	9½	43	35	8	20	27½	1 11/16
24	44	22	34	11	49½	40½	9	24	32	1⅞
30	50	25	41½	15	59	49	10	30	38¾	2⅛
36	56	28	49	18	..	..	..	36	46	2⅜
42	62	31	56½	21	..	..	..	..	53	2⅝
48	68	34	64	24	..	..	..	..	59½	2¾

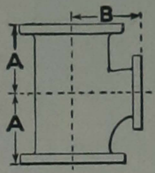
*Special angle fittings 1° to 45° use center to face dimension of 45° elbow, and 46° to 90° use center to face dimension of 90° elbow.

Furnished plain faced unless otherwise ordered.

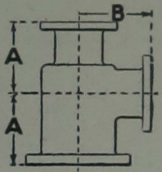
General Dimensions of Standard and Low Pressure Cast Iron Reducing Flanged Fittings

American Standard **Short Body Pattern**

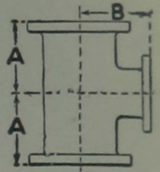
Reducing Tees and Crosses



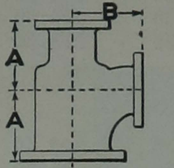
Single Sweep Tee



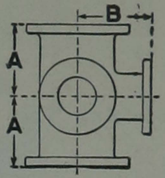
Tee



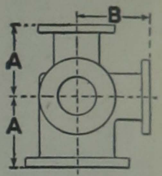
Tee



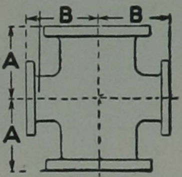
Tee



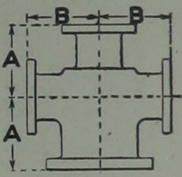
Side Outlet Tee



Side Outlet Tee



Cross



Cross

The dimensions of reducing flanged fittings are always regulated by the reduction of the outlet.

Fittings, reducing on the run only, the long body pattern will always be used, except double sweep tees, on which the reduced end is always longer than the regular fittings. Dimensions on request.

Bull heads or tees having outlets larger than the run will be the same length center to face of all openings as a tee with all openings of the size of the outlet. For example a 12x12x18-inch tee will be governed by the dimensions of the 18-inch long body tee, namely, 16½ inches center to face of all openings and 33 inches face to face.

Reducing elbows carry same center to face dimensions as regular elbows of largest straight size.

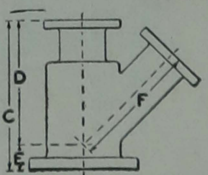
All reducing fittings 1 inch to 16 inches, inclusive, have the same center to face dimensions as straight size fittings.

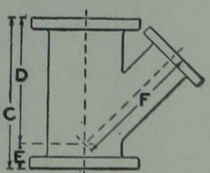
Dimensions, Inches

Size In.	*Size of Outlet and Smaller	AA, Face to Face Run	A, Center to Face Run	B, Center to Face Outlet
18	12	26	13	15½
20	14	28	14	17
24	16	30	15	19
30	20	36	18	23
36	24	40	20	26

*Long body patterns are used when outlets are larger than given in the above table, therefore have same dimensions as straight size patterns.

Reducing 45° Laterals





The dimensions of reducing flanged fittings are always regulated by the reduction of the branch; fittings reducing on the run only, the long body pattern will always be used.

All reducing fittings 1 inch to 16 inches, inclusive, have the same center to face dimensions as straight size fittings.

Dimensions, Inches

Size In.	*Size of Branch and Smaller	C, Face to Face Run	D, Center to Face Run	E, Center to Face Run	F, Center to Face Branch
18	8	26	25	1	27½
20	10	28	27	1	29½
24	12	32	31½	½	34½
30	14	39	39		42

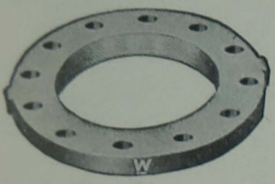
*Long body patterns are used when branches are larger than given in the above table, therefore have same dimensions as straight size fittings.

Walworth Standard Pipe Flanges

Working Steam Pressures
125 Pounds—12 Inches and Smaller
100 Pounds—14 Inches and Larger

Companion Flanges

No. 1427 Cast Iron **No. 1428 Steeliron**



No. 1427

Back View

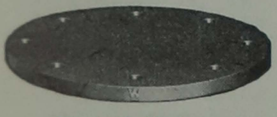
Size Inches	No. 1427, Each Faced	No. 1427, Each Faced & Drilled	No. 1428, Each Faced	No. 1428, Each Faced & Drilled	Extra for Galvanizing Each
1 x 4¼	$.55	$.80	$.70	$1.00	$.60
1¼x 4⅝	.60	.85	.75	1.05	.60
1½x 5	.65	.90	.80	1.10	.60
2 x 6	.75	1.00	.95	1.25	.70
2½x 7	.85	1.10	1.05	1.35	.75
3 x 7½	.95	1.25	1.20	1.55	.85
3½x 8½	1.20	1.55	1.50	1.95	1.00
4 x 9	1.35	1.80	1.70	2.25	1.20
5 x10	1.60	2.05	2.00	2.55	1.35
6 x11	2.00	2.50	2.50	3.10	1.65
8 x13½	3.10	3.80	3.90	4.75	2.50
10 x16	4.50	5.50	5.65	6.85	3.75
12 x19	6.50	7.65	8.15	9.55	5.00
14 x21	9.00	10.35	11.25	13.00	7.00
16 x23½	13.50	15.30	17.00	19.00	10.50
18 x25	16.00	18.00	20.00	22.50	.....
20 x27½	19.00	21.50	24.00	27.00	.....
24 x32	27.00	30.50	34.00	38.00	.....

Furnished faced only unless otherwise ordered.
Spot facing bolt holes, 10 cents per hole.

Blind Cast Iron Flanges

No. 1431 Plain **No. 1432 Ribbed**

16 Inches O.D. and Smaller ***19 Inches O.D. and Larger**



No. 1431 Plain

No. 1432 Ribbed

Size of Valve or Fitting and O.D. of Flange Inches		Faced	Each Faced & Drilled	Each Extra for Galvanizing
2 x 6		$1.15	$1.40	$1.00
2½x 7		1.30	1.55	1.10
3 x 7½		1.40	1.70	1.25
3½x 8½		1.80	2.15	1.50
4 x 9		2.00	2.45	1.80
5 x10		2.40	2.85	2.00
6 x11		3.00	3.50	2.50
8 x13½		4.60	5.30	3.75
10 x16		6.75	7.75	5.75
12 x19	Ribbed	9.75	10.90	7.50
14 x21	Ribbed	13.50	14.85	10.50
16 x23½	Ribbed	20.00	21.80	16.00
18 x25	Ribbed	24.00	26.00	.....
20 x27½	Ribbed	28.00	30.50	.....
24 x32	Ribbed	40.00	43.50	.....

Furnished faced only, unless otherwise specified.
Steeliron, 25 per cent advance.
Spot facing bolt holes, 10 cents per hole.
When ordering blind flanges, always give the outside diameter.
*Dished blind flanges, sizes 12x19 inches and larger, furnished upon order. Prices upon application.

Standard Malleable Iron Flanges

Standard malleable iron flanges use double the list price of standard cast iron flanges and discount applying to standard malleable iron flanges.

Standard Reducing Cast Iron Companion Flanges

For Standard Flanged Valves and Fittings

125 Pounds Steam Working Pressure

No. 529

These flanges, used in connection with straight or reducing fittings, make it possible to fill orders for reduced sizes more promptly. Customers who desire fittings reduced in this manner will please specify: Reduce by flanges if necessary.

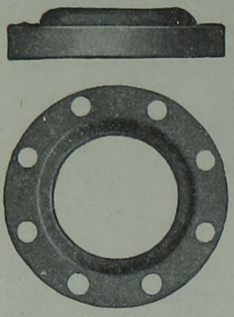
They will always be of the same thickness as the regular companion flanges of corresponding outside diameter, and drilled to the template corresponding to the outside diameter, unless otherwise ordered.

In ordering reducing companion flanges, always give the screwed or reduced size first, then the outside diameter of flange wanted; for instance, if a reducing flange is wanted to connect a 6-inch pipe to a 10-inch flanged valve or fitting having a 16-inch outside diameter flange, order a 6x16-inch reducing flange. This will clearly avoid the confusion often caused by orders incorrectly calling for a 10x6 or 6x10-inch flange.

Companion flanges are always furnished faced only, unless otherwise specified.

Size In.	Faced Only Each	Faced and Drilled Each
1 x 5	$1.15	$1.40
1 x 6	1.30	1.55
1 x 7½	1.55	1.85
1 x 9	2.20	2.65
1¼x 5	1.15	1.40
1¼x 6	1.30	1.55
1¼x 7½	1.55	1.85
1¼x 9	2.20	2.65
1½x 6	1.30	1.55
1½x 7	1.45	1.70
1½x 7½	1.55	1.85
1½x 8½	2.00	2.35
1½x 9	2.20	2.65
1½x10	2.65	3.10
1½x11	3.30	3.80
1½x13½	5.10	5.80
1½x16	7.45	8.45
1½x19	10.75	11.90
2 x 7	1.45	1.70
2 x 7½	1.55	1.85
2 x 8½	2.00	2.35
2 x 9	2.20	2.65
2 x10	2.65	3.10
2 x11	3.30	3.80
2 x13½	5.10	5.80
2 x16	7.45	8.45
2 x19	10.75	11.90
2½x 7½	1.55	1.85
2½x 8½	2.00	2.35
2½x 9	2.20	2.65
2½x10	2.65	3.10
2½x11	3.30	3.80
2½x13½	5.10	5.80
2½x16	7.45	8.45
2½x19	10.75	11.90
3 x 8½	2.00	2.35
3 x 9	2.20	2.65
3 x10	2.65	3.10
3 x11	3.30	3.80
3 x13½	5.10	5.80
3 x16	7.45	8.45
3 x19	10.75	11.90
3½x 9	2.20	2.65
3½x10	2.65	3.10
3½x11	$3.30	$3.80
3½x13½	5.10	5.80
3½x16	7.45	8.45
3½x19	10.75	11.90
4 x10	2.65	3.10
4 x11	3.30	3.80
4 x13½	5.10	5.80
4 x16	7.45	8.45
4 x19	10.75	11.90
4 x21	15.00	16.35
5 x11	3.30	3.80
5 x13½	5.10	5.80
5 x16	7.45	8.45
5 x19	10.75	11.90
5 x21	15.00	16.35
6 x13½	5.10	5.80
6 x16	7.45	8.45
6 x19	10.75	11.90
6 x21	15.00	16.35
6 x23½	22.00	23.80
6 x25	26.50	28.50
8 x16	7.45	8.45
8 x19	10.75	11.90
8 x21	15.00	16.35
8 x23½	22.00	23.80
8 x25	26.50	28.50
10 x19	10.75	11.90
10 x21	15.00	16.35
10 x23½	22.00	23.80
10 x25	26.50	28.50
12 x21	15.00	16.35
12 x23½	22.00	23.80
12 x25	26.50	28.50
14 x23½	22.00	23.80
14 x25	26.50	28.50
14 x27½	31.00	33.50
14 x32	44.00	47.50
16 x25	26.50	28.50
16 x27½	31.00	33.50
16 x32	44.00	47.50
18 x27½	31.00	33.50
18 x32	44.00	47.50
20 x32	44.00	47.50
....	.....	.....

Templates for Drilling Standard and Low Pressure Flanged Valves and Fittings



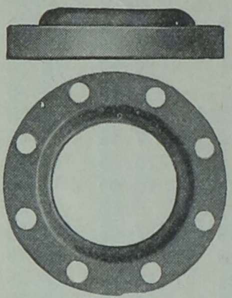
No. 530

These drilling templates are in multiples of four, so that fittings may be made to face in any quarter, and bolt holes straddle the center line. They can be drilled to any other template, if so desired. Bolt holes are drilled ⅛ inch larger than nominal diameter of bolts.

Bolt holes are spot faced only when so ordered except cast steel, which are always furnished spot faced.

Size In.	Diam. Flanges In.	Thickness Flanges In.	Bolt Circle In.	No. Bolts	Size Bolts In.	Bolt Lengths In.
1	4¼	7/16	3⅛	4	½	1½
1¼	4⅝	½	3½	4	½	1½
1½	5	9/16	3⅞	4	½	1¾
2	6	⅝	4¾	4	⅝	2
2½	7	11/16	5½	4	⅝	2¼
3	7½	¾	6	4	⅝	2¼
3½	8½	13/16	7	8	⅝	2½
4	9	15/16	7½	8	⅝	2¾
5	10	15/16	8½	8	¾	2¾
6	11	1	9½	8	¾	3
8	13½	1⅛	11¾	8	¾	3¼
10	16	1 3/16	14¼	12	⅞	3½
12	19	1¼	17	12	⅞	3¾
14	21	1⅜	18¾	12	1	4
16	23½	1 7/16	21¼	16	1	4¼
18	25	1 9/16	22¾	16	1⅛	4½
20	27½	1 11/16	25	20	1⅛	4¾
24	32	1⅞	29½	20	1¼	5¼
30	38¾	2⅛	36	28	1¼	5¾
36	46	2⅜	42¾	32	1½	6½
42	53	2⅝	49½	36	1½	7¼
48	59½	2¾	56	44	1½	7½
54	66¼	3	62¾	44	1¾	10¼
60	73	3⅛	69¼	52	1¾	10½
72	86½	3½	82½	60	1¾	11¼
84	99¾	3⅞	95½	64	2	12½
96	113¼	4¼	108½	68	2¼	13¾

Templates for Drilling Extra Heavy Flanged Valves and Fittings



No. 561

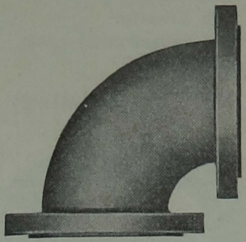
These drilling templates are in multiples of four, so that fittings may be made to face in any quarter, and bolt holes straddle the center line.

They can be drilled to any other template, if so desired. Bolt holes are drilled ⅛ inch larger than nominal diameter of bolts.

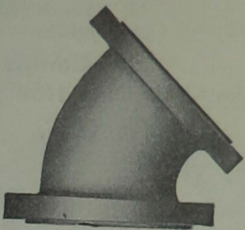
Bolt holes are spot faced only when so ordered except cast steel which are always furnished spot faced.

Size Inches	Diam. Flanges Inches	Thickness Flanges Inches	Bolt Circle Inches	No. of Bolts	Size Bolts Inches	Bolt Lengths Inches
1	4⅞	11/16	3½	4	⅝	2¼
1¼	5¼	¾	3⅞	4	⅝	2¼
1½	6⅛	13/16	4½	4	¾	2½
2	6½	⅞	5	8	⅝	2½
2½	7½	1	5⅞	8	¾	3
3	8¼	1⅛	6⅝	8	¾	3¼
3½	9	1 3/16	7¼	8	¾	3¼
4	10	1¼	7⅞	8	¾	3½
5	11	1⅜	9¼	8	¾	3¾
6	12½	1 7/16	10⅝	12	¾	3¾
8	15	1⅝	13	12	⅞	4½
10	17½	1⅞	15¼	16	1	5
12	20½	2	17¾	16	1⅛	5½
14	23	2⅛	20¼	20	1⅛	5¾
16	25½	2¼	22½	20	1¼	6
18	28	2⅜	24¾	24	1¼	6¼
20	30½	2½	27	24	1¼	6½
24	36	2¾	32	24	1½	7½
30	43	3	39¼	28	1¾	10¼
36	50	3⅜	46	32	2	11½
42	57	3 11/16	52¾	36	2	12
48	65	4	60¾	40	2	12¾

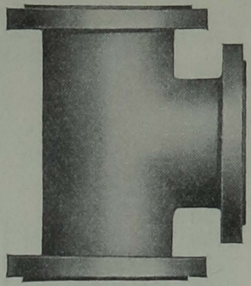
Extra Heavy Cast Iron Flanged Fittings



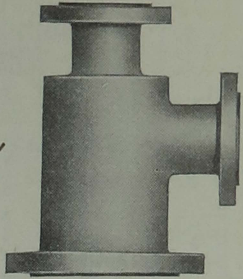
No. 531, Elbow



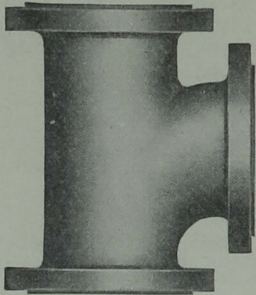
No. 532, 45° Elbow



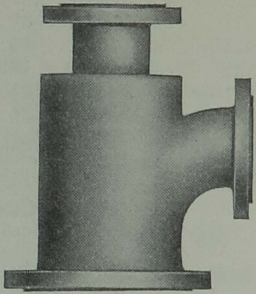
No. 540, Tee



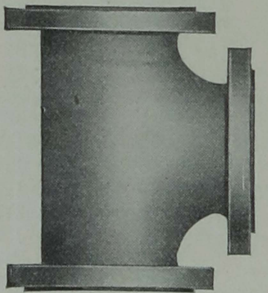
No. 541, Reducing Tee



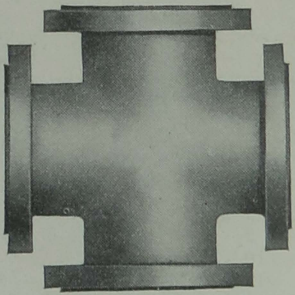
No. 542, Single Sweep Tee



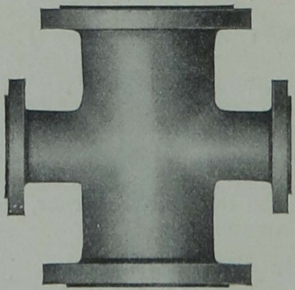
No. 543, Reducing Single Sweep Tee



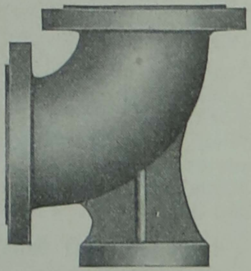
No. 544, Double Sweep Tee



No. 548, Cross



No. 549, Reducing Cross



No. 535, Base Elbow

Extra Heavy Cast Iron Flanged Fittings

250 Pounds Steam Working Pressure

Tees

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	$6.50	$7.85	6	$16.50	$19.50
1¼	6.50	7.85	8	26.00	29.75
1½	6.50	7.85	10	41.50	47.50
2	6.50	7.85	12	61.00	67.75
2½	6.90	8.25	14	90.00	98.25
3	7.50	9.15	16	119.00	131.00
3½	8.90	10.80	18	154.00	168.00
4	9.75	12.00	20	195.00	210.00
5	13.50	15.75	24	305.00	328.00

Reducing Tees

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1¼	$7.50	$8.85	8	$30.00	$33.75
1½	7.50	8.85	10	47.75	53.75
2	7.50	8.85	12	70.00	76.75
2½	8.00	9.35	14	103.50	111.75
3	8.60	10.25	16	137.00	149.00
3½	10.25	12.15	18	177.00	191.00
4	11.25	13.50	20	225.00	240.00
5	15.50	17.75	24	350.00	373.00
6	19.00	22.00	..	......	......

Crosses and Laterals

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	*$10.00	*$11.80	6	$25.00	$29.00
1¼	*10.00	*11.80	8	40.00	45.00
1½	*10.00	*11.80	10	63.00	71.00
2	10.00	11.80	12	92.00	101.00
2½	10.50	12.30	14	136.00	147.00
3	11.50	13.75	16	180.00	196.00
3½	13.50	16.00	18	235.00	253.00
4	15.00	18.00	20	300.00	320.00
5	20.50	23.50	24	465.00	495.00

*Crosses only.

Reducing Crosses and Laterals

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1¼	*$11.50	*$13.30	8	$46.00	$51.00
1½	*11.50	*13.30	10	72.00	80.00
2	*11.50	*13.30	12	106.00	115.00
2½	12.00	13.80	14	158.00	169.00
3	13.25	15.50	16	207.00	223.00
3½	15.50	18.00	18	270.00	288.00
4	17.00	20.00	20	345.00	365.00
5	23.50	26.50	24	535.00	565.00
6	29.00	33.00	..	......	......

*Crosses only.

Single and Double Sweep Tees

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
2	$7.50	$8.85	10	$47.75	$53.75
2½	8.00	9.35	12	70.00	76.75
3	8.60	10.25	14	103.50	111.75
3½	10.25	12.15	16	137.00	149.00
4	11.25	13.50	18	177.00	191.00
5	15.50	17.75	20	225.00	240.00
6	19.00	22.00	24	350.00	373.00
8	30.00	33.75	..	......	......

Reducing Single and Double Sweep Tees

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
2½	$9.15	$10.50	10	$55.00	$61.00
3	9.90	11.55	12	80.00	86.75
3½	11.75	13.65	14	119.00	127.25
4	13.00	15.25	16	158.00	170.00
5	17.85	20.10	18	204.00	218.00
6	22.00	25.00	20	260.00	275.00
8	34.50	38.25	24	402.00	425.00

All square turn and sweep pattern tees and crosses have same dimensions.

All flanged fittings will always be furnished faced only unless otherwise specified.

Extra Heavy Cast Iron Flanged Fittings

250 Pounds Steam Working Pressure

90° Elbows

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	$4.50	$5.40	6	$11.40	$13.40
1¼	4.50	5.40	8	18.00	20.50
1½	4.50	5.40	10	28.50	32.50
2	4.50	5.40	12	42.00	46.50
2½	4.75	5.65	14	62.00	67.50
3	5.15	6.25	16	82.00	90.00
3½	6.10	7.35	18	106.00	115.00
4	6.75	8.25	20	135.00	145.00
5	9.35	10.85	24	210.00	225.00

45° Elbows

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	$5.00	$5.90	6	$12.50	$14.50
1¼	5.00	5.90	8	19.00	21.50
1½	5.00	5.90	10	30.00	34.00
2	5.00	5.90	12	44.00	48.50
2½	5.25	6.15	14	62.00	67.50
3	5.65	6.75	16	82.00	90.00
3½	6.75	8.00	18	106.00	115.00
4	7.50	9.00	20	135.00	145.00
5	10.35	11.85	24	210.00	225.00

Reducing Elbows

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1½	$9.00	$9.90	6	$22.75	$24.75
2	9.00	9.90	8	36.00	38.50
2½	9.50	10.40	10	57.00	61.00
3	10.25	11.35	12	84.00	88.50
3½	12.25	13.50	14	105.00	110.50
4	13.50	15.00	16	135.00	143.00
5	18.75	20.25	..	......	......

Long Radius Elbows

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1	$7.50	$8.85	6	$19.00	$22.00
1¼	7.50	8.85	8	30.00	33.75
1½	7.50	8.85	10	47.75	53.75
2	7.50	8.85	12	70.00	76.75
2½	8.00	9.35	14	103.50	111.75
3	8.60	10.25	16	137.00	149.00
3½	10.25	12.15	18	177.00	191.00
4	11.25	13.50	20	225.00	240.00
5	15.50	17.75	..	......	......

Base Elbows

Size Inches	Faced Only Each	Faced and Drilled Each	Facing and Drilling Base Flanges Each
4	$13.50	$15.00	$4.50
5	18.75	20.25	5.25
6	22.75	24.75	5.25
8	36.00	38.50	7.50
10	57.00	61.00	7.50
12	84.00	88.50	11.00
14	105.00	110.50	11.00
16	135.00	143.00	11.00

Reducers

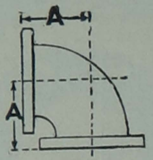
Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
2	$9.00	$9.90	10	$57.00	$61.00
2½	9.50	10.40	12	84.00	88.50
3	10.25	11.35	14	105.00	110.50
3½	12.25	13.50	16	135.00	143.00
4	13.50	15.00	18	157.00	166.00
5	18.75	20.25	20	180.00	190.00
6	22.75	24.75	24	285.00	300.00
8	36.00	38.50	..	......	......

All flanged fittings will always be furnished faced only, unless otherwise ordered.

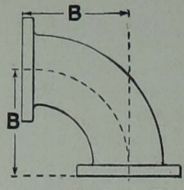
General Dimensions of Extra Heavy Flanged Fittings

Cast Iron, Ferrosteel and Cast Steel

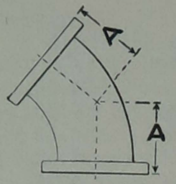
American Standard, Straight Sizes



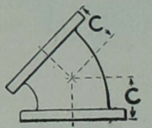
Ell



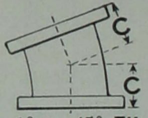
Long Radius Ell



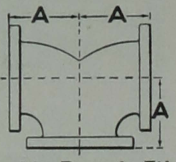
46° to 90° Ell



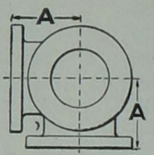
45° Ell



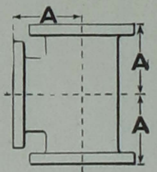
1° to 45° Ell



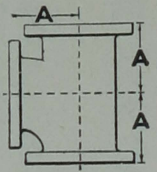
Double Branch Ell



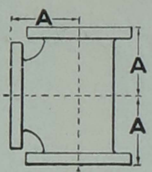
Side Outlet Ell



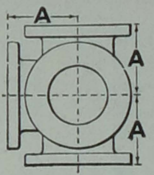
Tee



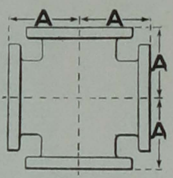
Single Sweep Tee



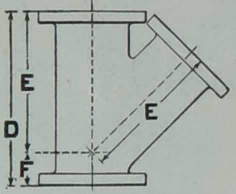
Double Sweep Tee



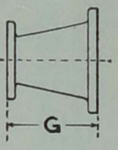
Side Outlet Tee



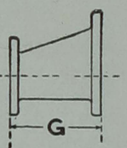
Cross



45° Lateral



Reducer



Eccentric Reducer

All extra heavy flanges have a 1/16-inch raised face inside of bolt holes. This raised face is included in face to face, center to face, and thickness of flange dimensions.

	Dimensions, Inches									
Size In.	AA, Face to Face Tees and Crosses	Center to Face *A, Elbows Tees and Crosses	Center to Face B Long Radius Elbows	Center to Face *C 45° Elbows	45° Laterals D Face to Face	45° Laterals E Center to Face	45° Laterals F Center to Face	G Face to Face Reducers	Flanges Diam.	Flanges Thickness
1	8	4	5	2	8½	6½	2	. . .	4⅞	11/16
1¼	8½	4¼	5½	2½	9½	7¼	2¼	. . .	5¼	¾
1½	9	4½	6	2¾	11	8½	2½	. . .	6⅛	13/16
2	10	5	6½	3	11½	9	2½	5	6½	⅞
2½	11	5½	7	3½	13	10½	2½	5½	7½	1
3	12	6	7¾	3½	14	11	3	6	8¼	1⅛
3½	13	6½	8½	4	15½	12½	3	6½	9	1 3/16
4	14	7	9	4½	16½	13½	3	7	10	1¼
5	16	8	10¼	5	18½	15	3½	8	11	1⅜
6	17	8½	11½	5½	21½	17½	4	9	12½	1 7/16
8	20	10	14	6	25½	20½	5	11	15	1⅝
10	23	11½	16½	7	29½	24	5½	12	17½	1⅞
12	26	13	19	8	33½	27½	6	14	20½	2
14	30	15	21½	8½	37½	31	6½	16	23	2⅛
16	33	16½	24	9½	42	34½	7½	18	25½	2¼
18	36	18	26½	10	45½	37½	8	19	28	2⅜
20	39	19½	29	10½	49	40½	8½	20	30½	2½
24	45	22½	34	12	57½	47½	10	24	36	2¾
30	55	27½	41½	15	. . . .	. . . .	. . . .	30	43	3

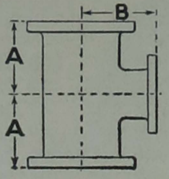
*Special angle fittings 1° to 45° use center to face dimension of 45° elbow and 46° to 90° use center to face dimension of 90° elbow.

General Dimensions of Extra Heavy Reducing Flanged Fittings

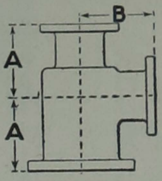
Cast Iron, Ferrosteel and Cast Steel

American Standard Short Body Pattern

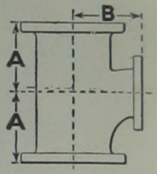
Reducing Tees and Crosses



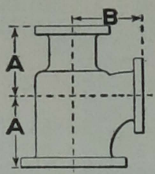
Tee



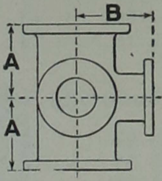
Tee



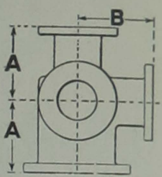
Single Sweep Tee



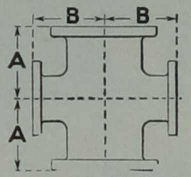
Single Sweep Tee



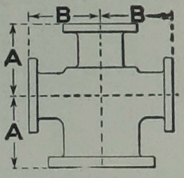
Side Outlet Tee



Side Outlet Tee



Cross



Cross

The dimensions of reducing flanged fittings are always regulated by the reduction of the outlet.

Fittings reducing on the run only, the long body pattern will always be used, except double sweep tees, on which the reduced end is always longer than the regular fitting. Dimensions on request.

Bull heads or tees having outlets larger than the run will be the same length center to face of all openings as a tee with all openings of the size of the outlet. For example, a 12x12x18-inch tee will be governed by the dimensions of the 18-inch long body tee, namely, 18 inches center to face of all openings and 36 inches face to face.

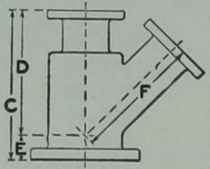
Reducing elbows carry same center to face dimension as regular elbows of largest straight size.

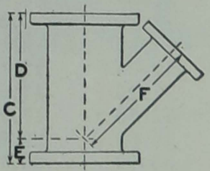
All reducing fittings 1 inch to 16 inches, inclusive, have the same center to face dimensions as straight size fittings.

	Dimensions, Inches			
Size Inches	*Size of Outlet and Smaller	AA, Face to Face Run	A, Center to Face Run	B, Center to Face Outlet
18	12	28	14	17
20	14	31	15½	18½
24	16	34	17	21½
30	20	41	20½	25½

*Long body patterns are used when outlets are larger than given in the above table, therefore have same dimensions as straight size fittings.

Reducing 45° Lateral





The dimensions of reducing flanged fittings are always regulated by the reduction of the branch; fittings reducing on the run only, the long body pattern will always be used.

All reducing fittings 1 inch to 16 inches, inclusive, have the same center to face dimensions as straight size fittings.

	Dimensions, Inches				
Size Inches	*Size of Branch and Smaller	C, Face to Face Run	D, Center to Face Run	E, Center to Face Run	F, Center to Face Branch
18	8	34	31	3	32½
20	10	37	34	3	36
24	12	44	41	3	43

*Long body patterns are used when branches are larger than given in the above table, therefore have same dimensions as straight size fittings.

Walworth Extra Heavy Pipe Flanges

250 Pounds Working Steam Pressure

Companion Flanges

No. 1459 Cast Iron **No. 1460 Steeliron**

Raised Face

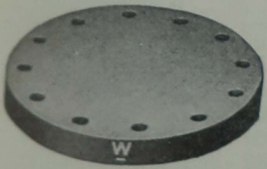
Back View

Size Inches	Diameter Inches	No. 1459, Each Faced	No. 1459, Each Faced & Drilled	No. 1469, Each Faced	No. 1469, Each Faced & Drilled	Extra for Galvanizing Each
1	4⅞	$.95	$1.30	$1.20	$1.65	$.85
1¼	5¼	1.00	1.35	1.25	1.70	.85
1½	6⅛	1.10	1.45	1.35	1.80	.85
2	6½	1.25	1.60	1.55	2.00	1.00
2½	7½	1.40	1.75	1.75	2.20	1.05
3	8¼	1.60	2.05	2.00	2.55	1.15
3½	9	2.00	2.55	2.50	3.20	1.40
4	10	2.25	2.95	2.80	3.70	1.65
5	11	2.65	3.35	3.30	4.20	1.90
6	12½	3.30	4.05	4.10	5.05	2.30
8	15	5.10	6.15	6.40	7.70	3.50
10	17½	7.40	8.90	9.25	11.00	5.25
12	20½	10.75	12.50	13.50	15.50	7.00
14	23	15.00	17.00	18.50	21.00	10.00
16	25½	22.25	25.00	28.00	31.00	15.00
18	28	26.00	29.00	32.50	36.00	.....
20	30½	31.00	35.00	39.00	44.00	.....
24	36	45.00	50.00	56.00	62.00	.....

Furnished faced only, unless otherwise ordered.
Spot facing bolt holes, 10 cents per hole.

Blind Flanges

No. 1462 Plain, Cast Iron **No. 1463 Ribbed, Cast Iron**
No. 1464 Plain, Steeliron **No. 1465 Ribbed, Steeliron**
15 Inches O.D. and Smaller *17½ Inches O.D. and Larger


No. 1462 Plain

No. 1463 Ribbed

Size of Valve or Fitting and O.D. of Flange Inches	Cast Iron, Each No. 1462 Plain No. 1463 Ribbed Faced	Cast Iron, Each No. 1462 Plain No. 1463 Ribbed Faced & Drilled	Steeliron, Each No. 1464 Plain No. 1465 Ribbed Faced	Steeliron, Each No. 1464 Plain No. 1465 Ribbed Faced & Drilled	Extra for Galvanizing Each
1½x 6⅛	$1.65	$2.00	$2.05	$2.50	$1.25
2 x 6½	1.90	2.25	2.35	2.80	1.50
2½x 7½	2.10	2.45	2.60	3.05	1.60
3 x 8¼	2.40	2.85	3.00	3.55	1.75
3½x 9	3.00	3.55	3.75	4.45	2.10
4 x10	3.35	4.05	4.20	5.10	2.50
5 x11	4.00	4.70	5.00	5.90	2.85
6 x12½	5.00	5.75	6.25	7.20	3.50
8 x15	7.65	8.70	9.60	10.90	5.25
10 x17½ Ribbed	11.00	12.50	13.75	15.50	8.00
12 x20½ Ribbed	16.00	17.75	20.00	22.00	10.50
14 x23 Ribbed	22.50	24.50	28.00	30.50	15.00
16 x25½ Ribbed	33.50	36.25	42.00	45.00	22.50
18 x28 Ribbed	39.00	42.00	48.50	52.00	.....
20 x30½ Ribbed	46.00	50.00	57.50	62.50	.....
24 x36 Ribbed	67.00	72.00	84.00	90.00	.....

Furnished faced only, unless otherwise ordered.
Spot facing bolt holes, 10 cents per hole.
When ordering blind flanges, always give the outside diameter.

*Dished blind flanges, sizes 10x17½ inches and larger, furnished on order. Prices upon application.

Extra Heavy Malleable Iron Flanges

Extra heavy malleable iron flanges use double the list price of extra heavy cast iron flanges and discount applying to extra heavy malleable iron flanges.

Extra Heavy Cast Iron Reducing Companion Flanges

For Extra Heavy Flanged Valves and Fittings

250 Pounds Steam Working Pressure

No. 560

These flanges used in connection with straight or reducing fittings, make it possible to fill orders more promptly. Customers who desire fittings reduced in this manner will please specify: Reduce by flanges if necessary.

These flanges will always be of the same thickness as the regular companion flanges of corresponding outside diameters, and drilled to the template corresponding to the outside diameter, unless otherwise ordered.

In ordering reducing companion flanges always give the screwed or reduced size first, then the outside diameter of flange wanted; for instance, if a reducing flange is wanted to connect a 6-inch pipe to a 10-inch flanged valve or fitting having a 17½-inch o. d. flange, order a 6x17½-inch reducing flange. This will clearly avoid the confusion often caused by orders incorrectly calling for a 10x6 or a 6x10-inch flange.

Companion flanges are always furnished faced only, unless otherwise ordered.

Size Inches	Faced Only Each	Faced and Drilled Each	Size Inches	Faced Only Each	Faced and Drilled Each
1¼x 6⅛	$1.80	$2.15	3½x11	$4.40	$5.10
1½x 6½	2.10	2.45	3½x15	8.40	9.45
1½x 7½	2.30	2.65	3½x20½	17.50	19.25
1½x 8¼	2.65	3.10	4 x11	4.40	5.10
1½x 9	3.30	3.85	4 x12½	5.50	6.25
1½x10	3.70	4.40	4 x15	8.40	9.45
1½x11	4.40	5.10	4 x17½	12.00	13.50
1½x12½	5.50	6.25	4 x20½	17.50	19.25
1½x15	8.40	9.45	5 x12½	5.50	6.25
2 x 7½	2.30	2.65	5 x15	8.40	9.45
2 x 8¼	2.65	3.10	5 x17½	12.00	13.50
2 x 9	3.30	3.85	5 x20½	17.50	19.25
2 x10	3.70	4.40	6 x15	8.40	9.45
2 x11	4.40	5.10	6 x17½	12.00	13.50
2 x12½	5.50	6.25	6 x20½	17.50	19.25
2 x15	8.40	9.45	6 x23	25.00	27.00
2 x17½	12.00	13.50	8 x17½	12.00	13.50
2½x 8¼	2.65	3.10	8 x20½	17.50	19.25
2½x 9	3.30	3.85	8 x23	25.00	27.00
2½x10	3.70	4.40	10 x20½	17.50	19.25
2½x11	4.40	5.10	10 x23	25.00	27.00
2½x12½	5.50	6.25	10 x25½	37.00	39.75
2½x15	8.40	9.45	12 x23	25.00	27.00
2½x17½	12.00	13.50	12 x25½	37.00	39.75
2½x20½	17.50	19.25	12 x28	43.00	46.00
3 x 9	3.30	3.85	14 x25½	37.00	39.75
3 x10	3.70	4.40	14 x28	43.00	46.00
3 x11	4.40	5.10	14 x30½	51.00	55.00
3 x12½	5.50	6.25	16 x28	43.00	46.00
3 x15	8.40	9.45	16 x30½	51.00	55.00
3 x17½	12.00	13.50	18 x30½	51.00	55.00
3 x20½	17.50	19.25	18 x36	74.00	79.00
3½x10	3.70	4.40	20 x36	74.00	79.00

Cast Iron Fittings

Approximate Weight of Cast Iron Screwed Fittings

Weight in Pounds per 100 Pieces

Standard Pattern

Size In.	Elbows 90°	Elbows 45°	Tees	Crosses	Plugs	Bushings	*Reducers	Caps
1/4	15	14	20	30	.	.	...	..
3/8	22	24.5	32	40	4	4	...	..
1/2	40	32.5	52	65	8	4	...	..
3/4	65	58.5	96	112	14	8	...	..
1	101	97.5	146	200	19	12	...	..
1 1/4	168	154	228	223	31	..	100	90
1 1/2	208	182	285	352	75	50	141	110
2	327	300	440	500	82	80	220	184
2 1/2	502	438	725	704	140	136	286	249
3	765	618	1010	1210	190	200	370	420
3 1/2	1043	860	1330	1500	245	350	550	510
4	1260	1040	1700	2050	300	325	710	554
5	2260	1790	3030	3500	530	500	1075	800
6	3330	2500	4140	4960	685	600	1700	1200
8	6700	4760	8000	7500	1530	1000	2760	2100
10	11500	8200	12800	13625	3500	2200	5350	5300
12	17500	12400	20000	49200	4000	3200	7580	7900
14	.....	.....	.....	.....	....	5500	....	....

*Reducing to nearest size below.

Size In.	Lock Nuts	Companion Flanges	Flanged Unions	Return Bends C.P.	Return Bends O.P.	Y Bends
1/2	...	87	165	54	54	80
3/4	...	75	230	70	92	100
1	...	240	275	158	180	144
1 1/4	...	300	370	220	302	241
1 1/2	130	350	480	230	380	350
2	160	440	630	420	626	540
2 1/2	200	750	980	861	785	730
3	226	750	1240	1200	1400	1130
3 1/2	280	1100	1500	....	2330	....
4	348	1250	1750	....	....	2400
5	480	1560	2560	....	....	4300
6	793	1620	3350	....	....	5500
8	1400	2840	5320	....	....	11940
10	....	3800	8870	....	....	.....
12	....	5900	12000	....	....	.....
14	....	7800	14800	....	....	.....

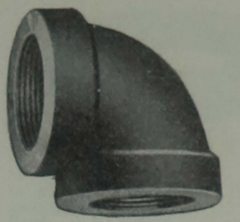
Extra Heavy Pattern

Size In.	90° Elbows	45° Elbows	Tees	Flange Unions
1/2	62	44	96	...
3/4	110	80	154	320
1	180	148	280	440
1 1/4	320	195	320	525
1 1/2	450	324	520	680
2	620	450	950	900
2 1/2	1060	750	1110	1250
3	1630	1050	1740	1400
3 1/2	2120	1500	2500	1800
4	3000	1910	3700	2250
5	4700	3200	6300	3350
6	6900	4800	10000	4000
8	14500	9000	18800	6700
10	18500	13300	29800	....
12	35400	23200	.....	....

Extra Heavy Cast Iron Fittings

For 250 Pounds Steam Working Pressure

Elbows

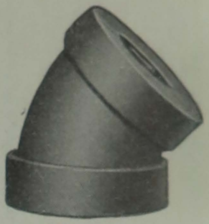


No. 400

Size In.	Elbows Each	Reducing Elbows Each	Size In.	Elbows Each	Reducing Elbows Each
1/4	$.20	....	3	$2.00	$2.50
3/8	.20	....	3 1/2	2.75	3.40
1/2	.25	....	4	3.50	4.40
3/4	.30	$.40	5	5.50	6.80
1	.35	.45	6	8.00	.....
1 1/4	.45	.55	8	17.00	.....
1 1/2	.60	.75	10	28.00	.....
2	.75	.95	12	40.00	.....
2 1/2	1.25	1.55	....	.....	.....

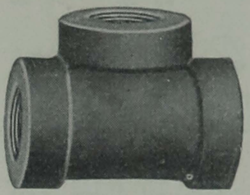
45° Elbows

Size In.	Each	Size In.	Each	Size In.	Each
3/8	$.30	2	$.90	6	$9.75
1/2	.35	2 1/2	1.50	8	21.00
3/4	.40	3	2.50	10	34.00
1	.44	3 1/2	3.50	12	48.00
1 1/4	.55	4	4.50	..	.....
1 1/2	.70	5	6.75	..	.....



No. 401

Tees

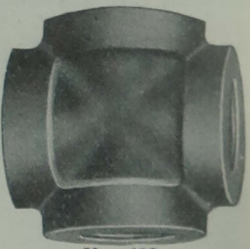


No. 402

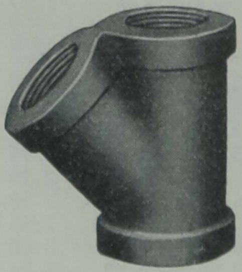
Size In.	Tees Each	Reduc. Each	Size In.	Tees Each	Reduc. Each
1/4	$.35	....	3	$3.00	$3.75
3/8	.35	....	3 1/2	4.25	5.30
1/2	.40	....	4	5.50	6.85
3/4	.45	$.60	5	8.25	10.25
1	.55	.70	6	12.00	15.00
1 1/4	.70	.90	8	25.00	31.00
1 1/2	.90	1.15	10	42.00	52.00
2	1.15	1.40	12	60.00	75.00
2 1/2	1.80	2.25	....	.....	.....

Crosses

Size In.	Crosses Each	Size In.	Crosses Each
1	$.70	4	$7.00
1 1/4	.90	5	11.00
1 1/2	1.20	6	16.00
2	1.50	8	34.00
2 1/2	2.50	10	56.00
3	4.00	12	80.00
3 1/2	5.50	..	.....



No. 403



No. 404

Y Branches

Size In.	Y Branches Each	Size In.	Y Branches Each
1 1/4	$1.35	4	$11.00
1 1/2	1.80	5	16.50
2	2.25	6	24.00
2 1/2	3.75	8	50.00
3	6.00	10	.....
3 1/2	....	12	.....

Reducers

Size Inches	Each	Size Inches	Each	Size Inches	Each	Size Inches	Each
3/4	$.33	2	$.83	4	$3.85	10	$31.00
1	.39	2 1/2	1.38	5	6.00	12	44.00
1 1/4	.50	3	2.20	6	8.80	..	.....
1 1/2	.66	3 1/2	3.05	8	18.75	..	.....

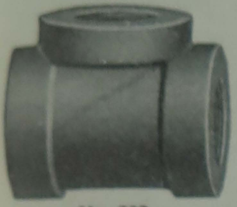
Plugs

Size Inches	Each	Size Inches	Each	Size Inches	Each	Size Inches	Each
3/4	$.06	2	$.15	4	$.63	10	$5.75
1	.08	2 1/2	.27	5	1.35	12	7.50
1 1/4	.09	3	.38	6	1.80	..	....
1 1/2	.11	3 1/2	.57	8	4.15	..	....

For galvanized extra heavy fittings, double above lists.

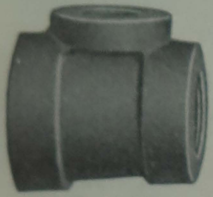
Cast Iron Screwed Fittings

Straight Tees


No. 309

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.08	$.16	3	$1.10	$2.20
⅜	.08	.16	3½	1.50	3.00
½	.09	.18	4	1.75	3.50
¾	.12	.24	5	3.00	6.00
1	.15	.30	6	4.00	8.00
1¼	.23	.46	8	9.75	19.50
1½	.29	.58	10	19.50	39.00
2	.41	.82	12	29.00	58.00
2½	.73	1.46	....	.....	.....

Reducing Tees


No. 310, on Run

No. 311, on Outlet

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅜	$.09	$.18	3	$1.25	$2.50
½	.10	.20	3½	1.75	3.50
¾	.14	.28	4	2.00	4.00
1	.17	.34	5	3.50	7.00
1¼	.27	.54	6	4.60	9.20
1½	.33	.66	8	11.25	22.50
2	.47	.94	10	22.50	45.00
2½	.83	1.66	12	33.50	67.00

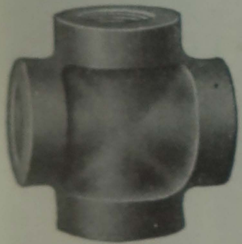
Tees reducing on the run are described thus:

1
1½ ——|—— 1¼
and are read 1½x1¼x1.

Tees reducing on the outlet are described thus:

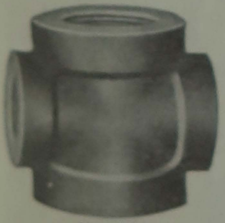
1
1½ ——|—— 1½
and are read 1½x1.

Straight Crosses


No. 313

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.15	$.30	3	$2.00	$4.00
⅜	.15	.30	3½	2.70	5.40
½	.16	.32	4	3.15	6.30
¾	.22	.44	5	5.50	11.00
1	.27	.54	6	7.25	14.50
1¼	.42	.84	8	17.50	35.00
1½	.53	1.06	10	35.00	70.00
2	.75	1.50	12	52.50	105.00
2½	1.30	2.60	..	.....	......

Reducing Crosses


No. 314

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
½	$.18	$.36	3½	$3.00	$6.00
¾	.25	.50	4	3.50	7.00
1	.30	.60	5	6.00	12.00
1¼	.46	.92	6	8.00	16.00
1½	.60	1.20	8	19.25	38.50
2	.83	1.66	10	38.50	77.00
2½	1.45	2.90	12	58.00	116.00
3	2.20	4.40	..	.....	......

Y Branches

No. 316

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
½	$.20	$.40	3½	$3.50	$7.00
¾	.28	.56	4	4.00	8.00
1	.34	.68	5	7.00	14.00
1¼	.54	1.08	6	9.20	18.40
1½	.66	1.32	8	22.50	45.00
2	.94	1.88	10	45.00	90.00
2½	1.66	3.32	12	67.00	134.00
3	2.50	5.00	....	.....	......

Cast Iron Screwed Fittings

Straight Elbows

No. 300, Right Hand

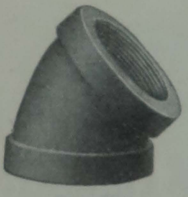
No. 301, Right and Left

	Right Hand		Right & Left			Right Hand	
Size Inches	Black Each	Galv. Each	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
¼	$.05	$.10	$.06	$.12	3½	$1.05	$2.10
⅜	.05	.10	.06	.12	4	1.20	2.40
½	.06	.12	.07	.14	5	2.00	4.00
¾	.08	.16	.09	.18	6	2.75	5.50
1	.10½	.21	.12	.24	8	6.75	13.50
1¼	.16	.32	.18	.36	10	13.50	27.00
1½	.20	.40	.23	.46	12	20.00	40.00
2	.28	.56	.32	.64	...	.....	.....
2½	.50	1.00	.60	1.20	...	.....	.....
3	.75	1.50	.85	1.70	...	.....	.....

Straight Pitched Elbows

Tapped to Pitch ¼-Inch to the Foot

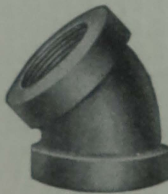
Size In	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
½	$.08	$.16	1¼	$.20	$.40	2½	$.65	$1.30	4	$1.50	$3.00
¾	.10	.20	1½	.25	.50	3	1.00	2.00	.	....	....
1	.13	.26	2	.35	.70	3½	1.30	2.60	.	....	....


No. 303

60° Elbows

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.25	$.50	2½	$1.10	$2.20
¾	.30	.60	3	1.65	3.30
1	.35	.70	4	2.75	5.50
1¼	.45	.90	5	5.00	10.00
1½	.50	1.00	6	7.00	14.00
2	.60	1.20	...	....	.....

45° Elbows


No. 304

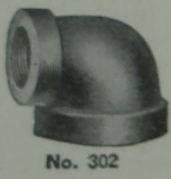
Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
¼	$.06	$.12	3	$.90	$1.80
⅜	.06	.12	3½	1.25	2.50
½	.07	.14	4	1.45	2.90
¾	.10	.20	5	2.50	5.00
1	.12	.24	6	3.45	6.90
1¼	.19	.38	8	8.50	17.00
1½	.24	.48	10	17.00	34.00
2	.34	.68	12	25.00	50.00
2½	.60	1.20	...	.....	.....

22½° Elbows

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.25	$.50	1½	$.50	$1.00	4	$2.75	$5.50
¾	.30	.60	2	.60	1.20	5	5.00	10.00
1	.35	.70	2½	1.10	2.20	6	7.00	14.00
1¼	.45	.90	3	1.65	3.30	...	.....	....

Reducing Elbows

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
⅜	$.06	$.12	3	$.85	$1.70
½	.07	.14	3½	1.20	2.40
¾	.09	.18	4	1.40	2.80
1	.12	.24	5	2.30	4.60
1¼	.18	.36	6	3.15	6.30
1½	.23	.46	8	7.75	15.50
2	.32	.64	10	15.50	31.00
2½	.60	1.20	12	23.00	46.00


No. 302

Pitched Reducing Elbows

Tapped to Pitch ¼-Inch to the Foot

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
¾	$.10	$.20	1½	$.25	$.50	3	$1.00	$2.00
1	.13	.26	2	.35	.70	3½	1.30	2.60
1¼	.20	.40	2½	.65	1.30	...	.....	.....

Cast Iron Screwed Fittings

Close Pattern Return Bends

Close pattern return bends will not make up parallel coils, as the distance, center to center, of two adjacent bends is greater than the center to center of opening of a single bend.

No. 324

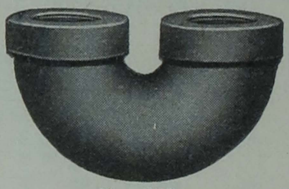
Size Inches	Right Hand Black Each	Right Hand Galvanized Each	Right & Left Hand Black Each	Right & Left Hand Galv. Each	Left Hand Black Each	Left Hand Galv. Each	Center to Center Inches
½	$.18	$.36	$.21	$.42	$.21	$.42	1¼
¾	.20	.40	.23	.46	.23	.46	1½
1	.22	.44	.26	.52	.26	.52	1¾
1¼	.28	.56	.33	.66	.33	.66	2¼
1½	.40	.80	.46	.92	.46	.92	2½
2	.57	1.14	.66	1.32	.66	1.32	3¼
2½	1.20	2.40	1.40	2.80	1.40	2.80	3¾
3	1.70	3.40	1.95	3.90	1.95	3.90	4¼
4	5.00	10.00	5.25	10.50	5.25	10.50	6

Close Pattern Pitched Return Bends

Size In.	Right Hand Blk. Each	Right Hand Galv. Each	C. to C. In.	Lgth. Coil Ft.	Size In.	Right Hand Blk. Each	Right Hand Galv. Each	C. to C. In.	Lgth. Coil Ft.	Size In.	Right Hand Blk. Each	Right Hand Galv. Each	C. to C. In.	Lgth. Coil Ft.
1	$.26	$.52	1¾	3	1	$.26	$.52	1¾	6	1¼	$.33	$.66	2¼	5
1	.26	.52	1¾	4	1	.26	.52	1¾	8	1¼	.33	.66	2¼	6
1	.26	.52	1¾	5	1¼	.33	.66	2¼	4	. . .	. . .	. . .	. . .	.

All right and left pitched return bends made to order; 1-inch bends for coils longer than 8 feet tapped straight. Pitched return bends have length of coil marked on them.

Open Pattern Return Bends



No. 325

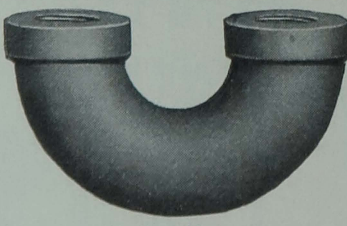
Size In.	Right Hand Black Each	Right Hand Galv. Each	R. & L. Hand Black Each	R. & L. Hand Galv. Each	Center to Center In.	Size In.	Right Hand Black Each	Right Hand Galv. Each	R. & L. Hand Black Each	R. & L. Hand Galv. Each	Center to Center In.
¾	$.26	$.52	$.30	$.60	1⅞	2	$.80	$1.60	$.92	$1.84	4½
1	.30	.60	.35	.70	2½	2½	1.35	2.70	1.55	3.10	5½
1¼	.40	.80	.46	.92	3	3	2.20	4.40	2.50	5.00	6½
1½	.55	1.10	.64	1.28	3½	4	6.50	10.00	7.00	14.00	7½

Return Bends with Back Outlet

Size In.	Right Hand Blk. Each	Right Hand Galv. Each	R. & L. Hand Blk. Each	R. & L. Hand Galv. Each	C. to C. In.	Size Back Outlet In.	Size In.	Right Hand Blk. Each	Right Hand Galv. Each	R. & L. Hand Blk. Each	R. & L. Hand Galv. Each	C. to C. In.	Size Back Outlet In.
¾	$.38	$.76	$.42	$.84	1⅞	¾	1½	....	....	....	....	4	1½
1	.42	.84	.48	.96	2¼	1	2	$1.15	$2.30	$1.30	$2.60	3¼	2
1	....	....	....	....	4	1¼	2	....	....	....	....	4	1½
1¼	.60	1.20	.70	1.40	2¼	1¼	2½	2.00	4.00	2.30	4.60	3¾	2½
1¼	....	....	...	...	3¼	1½	3	3.00	6.00	3.50	7.00	4¼	3
1½	.80	1.60	.95	1.90	2½	1½	...	....	....	....	....	..	..

The back outlet of right and left return bends is threaded right hand.

Wide Pattern Return Bends



No. 326

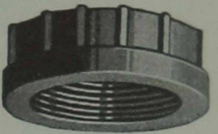
Size Inches	Right Hand Black Each	Right Hand Galv. Each	Center to Center Inches	Size Inches	Right Hand Black Each	Right Hand Galv. Each	Center to Center Inches
1	$.45	$.80	3	1½	$1.60	$2.60	6
1	.50	.90	4	1½	2.00	3.25	8
1	.60	1.10	5	2	1.75	3.00	4⅞
1	.75	1.30	6	2	2.00	3.25	6
1	1.00	1.60	8	2	3.00	4.50	7
1¼	1.00	1.75	4	2	3.50	5.00	8
1¼	1.25	2.00	6	4	7.50	11.00	11
1½	1.30	2.30	4⅞	...	....	.....	....

Cast Iron Screwed Reducers

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¾	$.10	$.20	3½	$1.00	$2.00
1	.16	.32	4	1.35	2.70
1¼	.22	.44	5	2.00	4.00
1½	.28	.56	6	2.70	5.40
2	.43	.86	8	6.75	13.50
2½	.60	1.20	10	10.00	20.00
3	.80	1.60	12	15.00	30.00

Cast Iron Caps

Size In.	Each Black	Each Galv.	Size In.	Each Black	Each Galv.
4	$.87	$1.74	8	$2.85	$5.70
5	1.20	2.40	10	5.50	11.00
6	1.55	3.10	12	7.00	14.00



Cast Iron Screwed Fittings

Hexagon Bushings

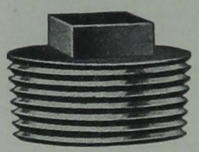
No. 320

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¾	$.05	$.10	3½	$.40	$.80
1	.06	.12	4	.50	1.00
1¼	.07	.14	5	.93	1.85
1½	.09	.18	6	1.25	2.50
2	.14	.28	8	2.75	5.50
2½	.21	.42	10	3.75	7.50
3	.30	.60	12	5.00	10.00

Face Bushings

4	$1.50	$2.25	6	$3.75	$5.60
5	2.60	3.90	.	....	....

Square Head Plugs



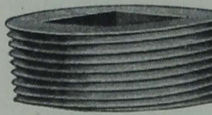
No. 321

⅛	$.02	$.04	2½	$.18	$.36
¼	.02	.04	3	.25	.50
⅜	.02	.04	3½	.38	.76
½	.02	.04	4	.42	.84
¾	.03	.06	5	.88	1.75
1	.04	.08	6	1.20	2.40
1¼	.05	.10	8	2.75	5.50
1½	.07	.14	10	3.75	7.50
2	.10	.20	12	5.00	10.00

Solid Plugs

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.02	$.04	¾	$.06	$.12	2	$.15	$.30	4	$.63	1.26
¼	.02	.04	1	.08	.16	2½	.27	.54	5	1.35	2.70
⅜	.02	.04	1¼	.09	.18	3	.38	.76	.	....	....
½	.04	.08	1½	.11	.22	3½	.57	1.14	.	....	....

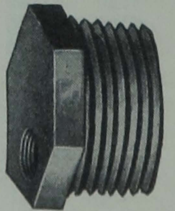
Countersunk Plugs



No. 322

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.04	$.08	2	$.15	$ .30
⅜	.04	.08	2½	.30	.60
½	.04	.08	3	.40	.80
¾	.06	.12	3½	.92	1.84
1	.08	.16	4	1.10	2.20
1¼	.09	.18	5	2.00	4.00
1½	.11	.22	6	3.50	7.00

Cast Iron Eccentric Bushings



Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
1¼	$.22	$.44	3½	$.80	$1.60
1½	.25	.50	4	1.00	2.00
2	.27	.54	5	1.85	3.70
2½	.42	.84	6	2.50	5.00
3	.60	1.20	...	....	....

Cast Iron Locknuts

No. 323

Size In.	Black Each	Gal. Each	Size In.	Black Each	Gal. Each
2½	$.27	$.54	6	$1.30	$2.60
3	.34	.68	8	2.35	4.70
3½	.47	.94	10	3.00	6.00
4	.64	1.28	12	4.00	8.00
5	.90	1.80	..	....	.....

No. 521

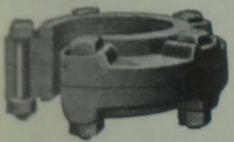
Common Cast Iron Flanges

Not Faced

Size Inches	Each	Size Inches	Each	Size Inches	Each
¾x4	$.22	2 x7	$.62	3½x 8	$.90
¾x5	.30	2 x8	.90	3½x 8½	1.00
1 x5	.30	2½x6	.42	4 x 8	.90
1 x6	.42	2½x6½	.50	4 x 9	1.15
1¼x4½	.25	2½x7	.62	4 x10	1.50
1¼x5	.30	2½x8	.90	5 x10	1.50
1¼x6	.40	3 x6½	.50	5 x11	1.75
1½x5	.30	3 x7	.62	6 x10	1.50
1½x6	.40	3 x7½	.75	6 x11	1.75
2 x6	.42	3 x8	.90	6 x12	2.20
2 x6½	.50	3 x9	1.15	8 x13½	2.80

Standard Cast Iron Flange Unions

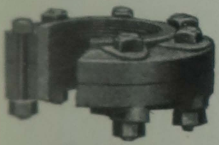
For 125 Pounds Steam Working Pressure



No. 351

Size In.	Black Each	Galv. Each	Diam. Flanges In.	No. of Bolts	Size In.	Black Each	Galv. Each	Diam. Flanges In.	No. of Bolts
½	$.40	$.80	2¾	3	3½	$1.80	$3.60	7¼	4
¾	.46	.92	3⅜	3	4	2.10	4.20	7¾	5
1	.52	1.04	3⅝	3	5	3.15	6.30	9⅛	5
1¼	.64	1.28	4⅛	4	6	3.95	7.90	10⅜	6
1½	.78	1.56	4½	4	8	7.00	14.00	12¾	8
2	1.00	2.00	5⅛	4	10	11.50	23.00	15½	10
2½	1.25	2.50	5⅞	4	12	16.00	32.00	17⅞	12
3	1.50	3.00	6⅝	4	....	.....	.....	....	..

Extra Heavy Cast Iron Flange Unions



No. 415

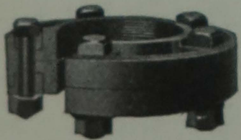
For 250 Pounds Steam Working Pressure

Size Inches	Black Each	Galv. Each	Diameter Flanges Inches	No. of Bolts	Size Inches	Black Each	Galv. Each	Diameter Flanges Inches	No. of Bolts
½	$.70	$1.40	3¼	4	3	$2.25	$4.50	6¾	6
¾	.70	1.40	3¼	4	3½	2.70	5.40	7½	6
1	.80	1.60	3⅝	4	4	3.15	6.30	8	7
1¼	1.00	2.00	4⅛	4	5	4.75	9.50	9⅜	8
1½	1.15	2.30	4⅝	4	6	6.00	12.00	10⅞	9
2	1.50	3.00	5⅜	5	8	10.50	21.00	13¼	10
2½	1.90	3.80	6	5	...	.....	.....	....	..

Malleable Iron Flange Unions

Faced

For 125 Pounds Steam Working Pressure



No. 158

Size In.	Diam. Flanges In.	No. Bolts	Price, Each Black	Price, Each Galv.	Size In.	Diam. Flanges In.	No. Bolts	Price, Each Black	Price, Each Galv.
¾	2⅞	3	$1.40	$2.80	3½	7½	4	$5.25	$10.50
1	3¼	4	1.60	3.20	4	7¾	5	6.00	12.00
1¼	3¾	4	2.00	4.00	5	9⅜	5	8.00	16.00
1½	4⅝	4	2.50	5.00	6	10⅜	6	9.00	18.00
2	5⅛	4	3.00	6.00	8	12¾	7	18.00	36.00
2½	5⅞	4	3.50	7.00	10	15½	10	33.00	66.00
3	6⅝	4	4.40	8.80	12	17⅞	12	46.00	92.00

Crane 300-Pound Malleable Iron Fittings

For 300 Pounds Steam Working Pressure at 500° F.
For Water, Oil or Gas Working Pressures, Non-Shock, at Atmospheric Temperature: Sizes ¼ to 1-Inch, 2000 Pounds; Sizes 1¼ to 2-Inch, 1500 Pounds and Sizes 2½ to 3-Inch, 1000 Pounds
For 300 Pounds Air Test Pressure, Under Water

CRANE
300
ARA
MALL

No. 260E, *90° Elbow

CRANE
300
ARA
MALL

No. 262E, *45° Elbow

No. 268E, 90° Street Elbow

No. 262½E 45° Street Elbow

MALL
CRANE
300
ARA

No. 264E *Tee

CRANE
300
ARA
MALL

No. 266E *Cross

ARA
CRANE
300
MALL

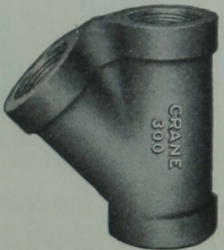
No. 267E, Reducer

ARA
CRANE
MALL

No. 278E, Cap

No. 280E, Coupling

No. 272E, Return Bend



No. 276E, 45° Y Bend

Suitable for severe service and will withstand rough usage, piping strains, vibration and expansion and contraction.

Size....................in.	¼	⅜	½	¾	1
*No. 260E, 90° Elbows...ea.	$.20	$.25	$.30	$.35	$.40
*No. 262E, 45° Elbows...ea.	.25	.30	.35	.42	.50
No. 262½E, 45° St. Elbows.ea.	.31	.38	.50	.56	.63
*No. 264E, Tees.........ea.	.30	.40	.45	.50	.60
*No. 266E, Crosses.......ea.	.60	.80	.90	1.00	1.20
*No. 267E, Reducers.....ea.	...	.25	.28	.30	.40
No. 268 E, 90° St. Elbows.ea.	.25	.30	.40	.45	.50
No. 276E, 45° Y Bends..ea.	...	...	.95	1.05	1.25
*No. 278E, Caps.........ea,	.16	.17	.19	.23	.29
No. 280E, Couplings....ea.	.16	.18	.20	.25	.32

Size....................in.	1¼	1½	2	2½	3
*No. 260E, 90° Elbows...ea.	$.55	$.70	$.90	$1.50	$2.40
*No. 262E. 45° Elbows...ea.	.65	.85	1.10	1.85	2.85
No. 262½E, 45° St. Elbows.ea.	.88	1.12	1.55	....	....
*No. 264E, Tees.........ea.	.80	1.05	1.35	2.25	3.60
*No. 266E, Crosses.......ea.	1.60	2.10	2.70	4.50	7.20
*No. 267E, Reducers.....ea.	.45	.55	.70	1.30	2.25
No. 268E, 90° St. Elbows.ea.	.70	.90	1.25	2.10	3.10
No. 276E, 45° Y Bends..ea.	1.70	2.20	2.85	4.75	7.55
*No. 278E, Caps.........ea.	.38	.50	.65	1.00	1.35
No. 380E, Couplings....ea.	.46	.60	.85	1.30	1.80

No. 272E, Return Bends

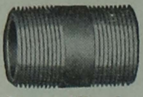
Size..........in.	1	1	1	1¼	1¼	1¼	1¼	1¼
Center to Center....in.	1¾	2½	3	2¼	2½	3	3½	4
No. 272E......ea.	$.60	.75	.85	.90	.95	1.00	1.15	1.20

Size...............in.	1¼	1½	1½	1½	1½	1½
Center to Center...in.	6	2½	3	3½	6	8
No. 272E..........ea.	$1.55	1.05	1.15	1.25	1.75	2.00

Size...............in.	2	2	2	2	2	2
Center to Center...in.	3	3½	4	4⅝	6	8
No. 275E..........ea.	$1.25	1.30	1.90	2.25	3.25	3.50

*A.R.A. fittings.

Close Nipple



Short Nipple

Standard Pipe Nipples

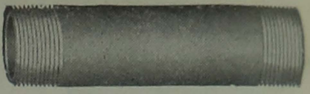
Effective September 1, 1933

Lists apply to wrought steel, genuine wrought iron, copper bearing, and tank nipples.

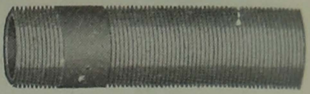
For list of black nipples made from extra strong pipe, double the list of black nipples. For list of black nipples made from double extra strong pipe, multiply price of standard black nipples by 4. For list of galvanized nipples made from extra strong pipe, add list of standard black nipples to list of standard galvanized nipples.

For price on Butt Nipples add 20% to price of short nipples. For list of lengths not listed (under 12 inches) use list of next longer length. For list of lengths over 12 to 24 inches, compute price by adding nearest equal lengths.

*Tank nipples are 6 inches long, standard pipe thread on one end, American Standard Locknut Thread 4 inches long on other end.



Long Nipple



Tank Nipple

Black Right Hand Nipples—Each

Diam. In.	Length Inches				Length, Inches														
					Long				Extra Long										
	Close	Short	Close	Short	2	2½	3	3½	4	4½	5	5½	*6	7	8	9	10	11	12
⅛	¾	1½	$.05	$.06	$.07	$.08	$.08	$.09	$.09	$.10	$.11	$.12	$.13	$.14	$.15	$.16	$.17	$.18	$.20
¼	⅞	1½	.05	.06	.07	.08	.08	.09	.09	.10	.11	.12	.13	.14	.15	.16	.17	.18	.20
⅜	1	1½	.05	.06	.07	.08	.08	.09	.09	.10	.11	.12	.13	.14	.15	.16	.17	.18	.20
½	1⅛	1½	.06	.07	.08	.09	.09	.10	.10	.11	.12	.13	.14	.15	.17	.19	.21	.23	.25
¾	1⅜	2	.08	.09	....	.10	.11	.12	.13	.14	.15	.16	.17	.19	.21	.23	.25	.27	.29
1	1½	2	.10	.11	....	.13	.14	.15	.16	.17	.18	.19	.20	.24	.27	.30	.32	.35	.38
1¼	1⅝	2½	.13	.15	....	....	.16	.18	.20	.22	.24	.26	.28	.32	.36	.40	.44	.48	.52
1½	1¾	2½	.16	.18	....	....	.20	.22	.25	.27	.29	.31	.34	.38	.43	.47	.52	.56	.60
2	2	2½	.21	.24	....	....	.28	.31	.34	.37	.40	.44	.48	.53	.59	.66	.78	.80	.87
2½	2½	3	.39	.45	....	....	....	.58	.63	.68	.73	.78	.85	.94	1.03	1.12	1.22	1.31	1.40
3	2⅝	3	.54	.59	....	....	....	.65	.73	.81	.89	.96	1.04	1.19	1.34	1.50	1.65	1.80	1.95
3½	2¾	4	.72	.98	....	....	....	....	....	1.06	1.14	1.21	1.29	1.45	1.61	1.76	1.92	2.08	2.24
4	2⅞	4	.92	1.12	....	....	....	....	....	1.28	1.38	1.48	1.60	1.80	2.00	2.20	2.40	2.60	2.80
4½	2⅞	4	1.35	1.60	....	....	....	....	....	1.75	1.90	2.10	2.25	2.50	2.75	3.00	3.25	3.50	3.75
5	3	4½	1.60	2.00	....	....	....	....	....	....	2.05	2.17	2.29	2.61	2.91	3.15	3.39	3.64	3.88
6	3⅛	4½	2.00	2.45	....	....	....	....	....	....	2.58	2.73	2.90	3.36	3.68	4.08	4.31	4.60	4.94
7	3¼	5	3.30	4.00	....	....	....	....	....	....	....	4.20	4.45	4.85	5.25	5.65	6.05	6.45	6.85
8	3½	5	4.30	4.87	....	....	....	....	....	....	....	5.00	5.44	5.71	6.10	6.48	6.85	7.25	7.65
9	3⅝	5	5.25	5.85	....	....	....	....	....	....	....	....	....	....	7.45	8.05	8.65	9.25	9.85
10	3⅞	5	5.88	6.50	....	....	....	....	....	....	....	....	....	....	8.00	8.55	9.10	9.65	10.20
12	4½	6	7.40	8.70	....	....	....	....	....	....	....	....	....	....	10.00	10.90	11.80	12.70	13.60
Black Right and Left Nipples—Each																			
⅛	¾	1½	$.07	$.08	$.10	$.11	$.11	$.12	$.12	$.13	$.15	$.16	$.17	$.19	$.20	$.21	$.23	$ 24	$.26
¼	⅞	1½	.07	.08	.10	.11	.11	.12	.12	.13	.15	.16	.17	.19	.20	.21	.23	.24	.26
⅜	1	1½	.07	.08	.10	.11	.11	.12	.12	.13	.15	.16	.17	.19	.20	.21	.23	.24	.26
½	1⅛	1½	.08	.10	.11	.12	.12	.13	.13	.15	.16	.17	.19	.20	.23	.25	.28	.30	.33
¾	1⅜	2	.11	.12	....	.13	.15	.16	.17	.19	.20	.21	.23	.25	.28	.30	.33	.36	.38
1	1½	2	.13	.15	....	.17	.19	.20	.21	.23	.24	.25	.26	.32	.36	.39	.42	.46	.50
1¼	1⅝	2½	.17	.20	....	....	.21	.24	.26	.29	.32	.34	.37	.42	.47	.52	.58	.63	.68
1½	1¾	2½	.21	.24	....	....	.26	.29	.33	.36	.38	.41	.45	.50	.56	.62	.68	.73	.78
2	2	2½	.28	.32	....	....	.37	.41	.45	.49	.52	.58	.63	.69	.77	.86	.95	1.04	1.14
2½	2½	3	.51	.59	....	....	....	.76	.82	.89	.95	1.02	1.11	1.23	1.34	1.46	1.59	1.71	1.82
3	2⅝	3	.71	.77	....	....	....	.85	.95	1.06	1.16	1.25	1.36	1.55	1.75	1.95	2.15	2.34	2.54
3½	2¾	4	.94	1.28	....	....	....	....	....	1.38	1.49	1.58	1.68	1.89	2.10	2.29	2.48	2.71	2.92
4	2⅞	4	1.20	1.46	....	....	....	....	....	1.67	1.80	1.93	2.08	2.34	2.60	2.86	3.12	3.38	3.64
Galvanized Right Hand Nipples—Each																			
⅛	¾	1½	$.07	$.08	$.10	$.11	$.12	$.13	$.14	$.15	$.16	$.17	$.19	$.22	$.25	$.28	$.30	$.33	$.36
¼	⅞	1½	.07	.08	.10	.11	.12	.13	.14	.15	.16	.17	.19	.22	.25	.28	.30	.33	.36
⅜	1	1½	.07	.08	.10	.11	.12	.13	.14	.15	.16	.17	.19	.22	.25	.28	.30	.33	.36
½	1⅛	1½	.08	.09	.11	.12	.13	.14	.15	.16	.17	.18	.20	.23	.26	.29	.32	.35	.38
¾	1⅜	2	.10	.12	....	.13	.14	.16	.18	.20	.22	.24	.26	.29	.32	.35	.39	.42	.45
1	1½	2	.13	.15	....	.18	.20	.22	.24	.26	.28	.30	.34	.38	.42	.46	.50	.54	.58
1¼	1⅝	2½	.17	.22	....	....	.26	.28	.30	.34	.37	.40	.44	.48	.56	.62	.68	.74	.80
1½	1¾	2½	.22	.26	....	....	.30	.34	.38	.42	.45	.48	.52	.58	.65	.73	.80	.87	.94
2	2	2½	.30	.35	....	....	.40	.45	.50	.55	.60	.65	.70	.79	.88	.97	1.06	1.15	1.24
2½	2½	3	.60	.66	....	....	....	.75	.83	.90	.98	1.06	1.14	1.28	1.44	1.60	1.76	1.92	2.08
3	2⅝	3	.80	.87	....	....	....	1.01	1.10	1.20	1.30	1.40	1.50	1.70	1.90	2.10	2.30	2.50	2.70
3½	2¾	4	1.15	1.40	....	....	....	....	....	1.53	1.65	1.78	1.91	2.16	2.41	2.66	2.91	3.16	3.41
4	2⅞	4	1.27	1.60	....	....	....	....	....	1.85	2.00	2.15	2.30	2.60	2.90	3.20	3.50	3.80	4.10
4½	2⅞	4	1.75	2.15	....	....	....	....	....	2.35	2.55	2.75	3.00	3.40	3.80	4.20	4.60	5.00	5.40
5	3	4½	2.29	2.87	....	....	....	....	....	....	3.01	3.21	3.40	3.95	4.35	4.73	5.12	5.52	5.90
6	3⅛	4½	2.86	3.56	....	....	....	....	....	....	3.79	4.03	4.30	5.00	5.52	6.03	6.53	7.05	7.54
7	3¼	5	4.10	5.35	....	....	....	....	....	....	....	5.70	6.05	6.75	7.45	8.15	8.85	9.55	10.25
8	3½	5	5.52	6.37	....	....	....	....	....	....	....	6.65	6.95	7.55	8.15	8.75	9.35	9.95	10.60
Galvanized Right and Left Nipples—Each																			
⅛	¾	1½	$.12	$.13	$.16	$.18	$.18	$.20	$.20	$.21	$.24	$.26	$.28	$.31	$.32	$.34	$.35	$.39	$.42
¼	⅞	1½	.12	.13	.16	.18	.18	.20	.20	.21	.24	.26	.28	.31	.32	.34	.35	.39	.42
⅜	1	1½	.12	.13	.16	.18	.18	.20	.20	.21	.24	.26	.28	.31	.32	.34	.35	.39	.42
½	1⅛	1½	.13	.16	.18	.20	.20	.21	.21	.24	.26	.28	.31	.32	.35	.40	.45	.48	.53
¾	1⅜	2	.18	.20	....	.21	.24	.26	.28	.31	.32	.34	.35	.40	.45	.48	.53	.58	.61
1	1½	2	.21	.24	....	.28	31	.32	.34	.35	.39	.40	.42	.52	.58	.63	.68	.74	.80
1¼	1⅝	2½	.28	.32	....	....	.34	.39	.42	.47	.52	.55	.60	.68	.76	.84	.93	1.01	1.09
1½	1¾	2½	.34	.39	....	....	.42	.47	.53	.58	.61	.66	.72	.80	.90	1.00	1.09	1.17	1.25
2	2	2½	.45	.52	....	....	.60	.66	.72	.79	.84	.93	1.01	1.11	1.24	1.38	1.52	1.67	1.83
2½	2½	3	.82	.95	....	....	....	1.22	1.32	1.43	1.52	1.64	1.78	1.97	2.15	2.34	2.55	2.74	2.92
3	2⅝	3	1.14	1.24	....	....	....	1.36	1.52	1.70	1.86	2.00	2.18	2.48	2.80	3.12	3.44	3.75	4.07
3½	2¾	4	1.51	2.05	....	....	....	....	....	2.19	2.39	2.53	2.69	3.03	3.36	3.67	3.97	4.34	4.68
4	2⅞	4	1.92	2.34	....	....	....	....	....	2.68	2.88	3.09	3.33	3.75	4.16	4.48	5.00	5.41	5.83

Malleable Iron Fittings

Approximate Weight of Black Malleable Iron Fittings

Weight in Pounds per 100 Pieces

Size In.	Elbows					Drop Elbows	
	Plain	Banded	Street	45°	Side Outlet Plain	Fem.	M. and F.
⅛	7	6½	6¼	7¼	...	..	..
¼	9	10	7½	11	...	16	..
⅜	14	17	16	17	19	18	24
½	22	26	24	22	29	27	35
¾	37	41	38	35	49	52	..
1	51	58	60	53	70	..	..
1¼	90	106	95	87	125	..	..
1½	120	136	131	115	170	..	..
2	192	226	221	200	260	..	..
2½	...	355	330	300	...	..	..
3	...	510	540	445	...	..	..
3½	...	700	815	620	...	..	..
4	...	940	980	790	...	..	..
5	...	1510	1410	1275	...	..	..
6	...	2420	2400	2040	...	..	..

Size In.	Tees				Drop Tees		Crosses	
	Plain	Banded	Service	4-Way	Fem.	M. and F.	Plain	Banded
⅛	8	9½	...	...	..	..	...	12
¼	12	15	14	...	..	..	16	19
⅜	20	23	24	24	20	19	23	28
½	30	36	33	37	35	22	36	43
¾	48	55	54	57	51	33	56	68
1	70	85	80	85	56	52	78	100
1¼	116	140	130	145	..	..	142	165
1½	158	185	170	185	..	..	179	210
2	265	300	295	315	..	..	307	350
2½	...	475	480	...	..	..	...	525
3	...	700	695	...	..	..	...	775
3½	...	940	...	...	..	..	...	1065
4	...	1220	...	...	..	..	...	1340
5	...	2050	...	...	..	..	...	2350
6	...	3010	...	...	..	..	...	3570

Size In.	Y's		Caps		Reducers		Cross-overs	Wash Tray Tees
	Plain	Banded	Plain	Banded	Plain	Banded		
⅛	...	....	..	3	..	.....	...	..
¼	...	....	5	5	6	7½	...	..
⅜	...	28	7	9	9	12	...	..
½	...	46	12	14	16	16	48	52
¾	...	66	20	27	20	27	85	80
1	...	110	32	35	33	42	115	..
1¼	170	185	..	58	60	61	...	..
1½	240	260	..	78	77	87	...	..
2	392	410	..	125	..	150	...	..
2½	458	625	..	190	..	260	...	..
3	...	1055	..	290	..	405	...	..
3½	...	....	..	390	..	555	...	..
4	...	1750	..	455	..	710	...	..
5	...	....	..	770	..	...	...	..
6	...	....	..	1110	..	...	...	..

Size In.	Return Bends			Couplings			Lock Nuts	Off-sets
	C.P.	Med.	O.P.	Banded R. and L.	Plain R.H.	Banded R.H.		
⅛	...	...	....	...	...	...	2¼	...
¼	...	...	....	8½	7	8½	3¼	...
⅜	...	...	....	14	11	13	4½	...
½	36	41	43	18	15	18	6½	...
¾	58	60	80	29	24	29	11	56
1	92	95	115	47	36	43	16	120
1¼	135	155	195	76	63	70	26	180
1½	185	220	295	100	85	100	35	...
2	325	380	445	170	143	170	51	...
2½	...	...	695	255	...	250	..	...
3	...	...	1060	340	...	330	..	...
3½	...	...	....	...	...	460	..	...

90° Malleable Elbows

Straight

No. 101

Size Inches	Each		Size Inches	Each	
	Black	Galv.		Black	Galv.
⅛	$.05	$.07	2	$.40	$.52
¼	.05	.07	2½	.72	.95
⅜	.06	.08	3	1.00	1.30
½	.07	.09	3½	1.50	1.95
¾	.10	.13	4	1.80	2.35
1	.13	.17	5	3.25	4.25
1¼	.20	.26	6	4.65	6.05
1½	.25	.33	...	....	....

Reducing

Size In.	Each		Size In.	Each		Size In.	Each	
	Black	Galv		Black	Galv.		Black	Galv.
¼	$.06	$.08	1¼	$.22	$.29	3½	$1.65	$2.15
⅜	.07	.09	1½	.28	.36	4	2.00	2.60
½	.08	.10	2	.44	.57	6	5.15	6.70
¾	.11	.14	2½	.80	1.05	...	....	....
1	.14	.18	3	1.10	1.45	...	....	....

Right and Left

¼	$.06	$.08	¾	$.12	$.16	1½	$.29	$.38
⅜	.07	.09	1	.15	.20	2	.46	.60
½	.08	.10	1¼	.23	.30	...	...	...

45° Malleable Elbows

Size In.	Each		Size In.	Each	
	Black	Galv.		Black	Galv.
⅛	$.06	$.08	2	$.48	$.62
¼	.06	.08	2½	.86	1.10
⅜	.07	.09	3	1.20	1.55
½	.09	.12	3½	1.80	2.35
¾	.12	.16	4	2.20	2.85
1	.16	.21	5	3.90	5.10
1¼	.24	.31	6	5.60	7.30
1½	.30	.39	...	....	....

No. 102

60° Malleable Elbows

Size Inches	Each		Size Inches	Each	
	Black	Galv.		Black	Galv.
1¼	$.31	$.40	2	$.62	$.80
1½	.40	.52	.	....	....

90° Malleable Street Elbows

Straight

No. 103

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv Each
⅛	$.06	$.08	2	$.46	$.60
¼	.06	.08	2½	.83	1.10
⅜	.07	.09	3	1.15	1.50
½	.08	.10	3½	1.80	2.35
¾	.12	.16	4	2.10	2.75
1	.15	.20	5	3.75	4.90
1¼	.23	.30	6	5.35	6.95
1½	.29	.38	...	....	....

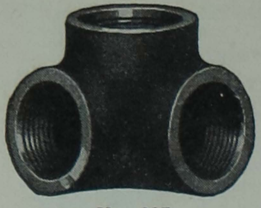
Reducing

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅜	$.08	$.10	1¼	$.25	$.33	2½	$.92	$1.20
¾	.13	.17	1½	.32	.42	3	1.30	1.70
1	.17	.22	2	.51	.66	4	2.30	3.00

45° Malleable Street Elbows

No. 104

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.07	$.09	1¼	$.28	$.36
¼	.07	.09	1½	.35	.46
⅜	.08	.10	2	.55	.72
½	.10	.13	2½	1.00	1.30
¾	.14	.18	3	1.40	1.85
1	.18	.23	4	2.55	3.30

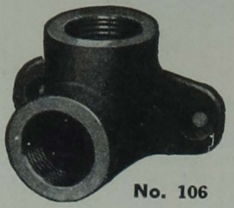

No. 105

Malleable Side Outlet Elbows

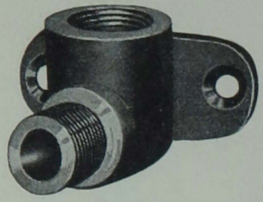
Size In.	Straight, Each Black	Straight, Each Galv.	Reducing, Each Black	Reducing, Each Galv.
¼	$.10	.13	...	...
⅜	.12	.16	.14	.18
½	.14	.18	.16	.21
¾	.20	.26	.22	.29
1	.26	.34	.28	.36
1¼	.40	.52	.44	.57
1½	.50	.65	...	...
2	.80	1.05	...	...

Malleable Drop Elbows

Female


No. 106

Size In.	Straight, Each Black	Straight, Each Galv.	Reducing, Each Black	Reducing, Each Galv.
¼	$.07	$.09	....	....
⅜	.08	.11	$.09	$.12
½	.12	.16	....	....
¾	.18	.23	.20	.26


No. 107
Short Drop

Malleable Drop Elbows

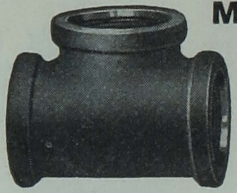
Male and Female

Size In.	Straight Black Each	Straight Galv. Each	Reducing Black Each	Reducing Galv. Each
⅜	$.08	$.11	$.09	$.12
½	.12	.16	.13	.17

Male and Female, Long

Size In.	Straight Black Each	Straight Galv. Each	Reducing Black Each	Reducing Galv. Each
⅜	$.10	$.13	$.11	$.14
½	.15	.20	.17	.22

Malleable Tees


No. 110, Straight

No. 111, Reducing

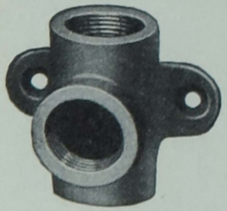
Size In.	Straight Each Black	Straight Each Galv.	Reducing Each Black	Reducing Each Galv.	Size In.	Straight Each Black	Straight Each Galv.	Reducing Each Black	Reducing Each Galv.
⅛	$.07	$.09	....	....	2	$.52	$.68	$.57	$.75
¼	.07	.09	$.08	$.10	2½	.90	1.20	1.00	1.30
⅜	.08	.10	.09	.12	3	1.30	1.70	1.45	1.90
½	.10	.13	.11	.14	3½	2.00	2.60	2.20	2.85
¾	.13	.17	.15	.20	4	2.40	3.10	2.65	3.45
1	.17	.22	.19	.25	5	4.25	5.55	4.70	6.10
1¼	.26	.34	.29	.38	6	6.00	7.80	6.60	8.60
1½	.33	.43	.37	.48	...	....	....	....	....

Malleable 4-Way Tees

No. 112

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.14	$.18	1	$.34	$.44
⅜	.16	.21	1¼	.52	.68
½	.20	.26	1½	.66	.86
¾	.26	.34	2	1.05	1.35

Malleable Drop Tees


No. 113, Female

Female

Size In.	Straight Black Each	Straight Galv. Each	Reducing Black Each	Reducing Galv. Each
⅜	$.10	$.13	$.11	$.14
½	.15	.20	.17	.22
¾	.22	.28	.24	.31
1	...	...	.32	.42

Male and Female

Size In.	Straight Black Each	Straight Galv. Each	Reducing Black Each	Reducing Galv. Each
⅜	$.10	$.13	$.11	$.14
½	...	...	.17	.22
¾	...	...	.24	.31
1	...	...	.32	.42

Male and Female, Long

Size In.	Straight Black Each	Straight Galv. Each	Reducing Black Each	Reducing Galv. Each
⅜	$.12	$.16	....	....
¾	...	...	$.29	$.38
1	...	...	.40	.52
1¼	...	...	.65	.85

Malleable Service Tees

No. 115

Straight

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.08	$.10	1½	$.38	$.50
⅜	.09	.12	2	.60	.78
½	.12	.16	2½	1.05	1.37
¾	.15	.20	3	1.50	1.95
1	.20	.26	4	2.75	3.60
1¼	.30	.39	...	....	....

Reducing

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅜	$.13	$.17	1¼	$.33	$.43	2½	$1.15	$1.50
¾	.17	.22	1½	.42	.55	3	1.65	2.15
1	.22	.29	2	.66	.86	4	3.05	3.95

Malleable Crosses

No. 116

Straight

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.09	$.12	1	$.23	$.30
¼	.09	.12	1¼	.35	.46
⅜	.11	.14	1½	.44	.57
½	.13	.17	2	.70	.90
¾	.18	.23	...	...	...

Reducing

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.10	$.13	¾	$.20	$.26	1½	$.48	$.62
⅜	.12	.16	1	.25	.33	2	.77	1.00
½	.14	.18	1¼	.38	.50	...	...	....

45° Malleable Y Bends

No. 119

Straight

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅜	$.10	$.13	1½	$.57	$.75
½	.14	.18	2	.85	1.10
¾	.18	.23	2½	1.55	2.00
1	.25	.33	3	2.80	3.65
1¼	.40	.52	4	4.80	6.25

Reducing

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
1	$.28	$.36	2	$.95	$1.25	5	$9.00	$11.70
1¼	.44	.57	2½	1.70	2.20	6	13.00	16.90
1½	.63	.82	3	3.10	4.05	..	.....	.....

Straight 60° Malleable Y Bends

Finish	Black	Galv.
2-Inch Size, each	$1.00	$1.30

Malleable Right and Left-Hand Couplings

No. 122

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.05	$.07	1¼	$.16	$.21
¼	.05	.07	1½	.21	.27
⅜	.05	.07	2	.34	.44
½	.06	.08	2½	.60	.78
¾	.09	.12	3	.85	1.10
1	.12	.16	...	...	....

Malleable Right Hand Couplings

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.05	$.07	1	$.12	$.16	3	$.85	$1.10
¼	.05	.07	1¼	.16	.21	3½	1.25	1.60
⅜	.05	.07	1½	.21	.27	4	1.50	1.95
½	.06	.08	2	.34	.44	5	2.00	3.60
¾	.09	.12	2½	.60	.78	6	3.05	3.95

Close Pattern Malleable Return Bends

No. 131

Will not make up parallel coils, as distance, center to center, of two adjacent bends is greater than center to center distance between openings of a single bend.

Size Inches	Right-Hand Each Black	Right-Hand Each Galv.	Right and Left Each Black	Right and Left Each Galv.	Center to Center Inches
½	$.16	$.21	$.18	$.23	1
¾	.18	.23	.21	.27	1¼
1	.24	.31	.28	.36	1½
1¼	.36	.47	.42	.55	1¾
1½	.49	.64	.56	.73	2³⁄₁₆
2	.80	1.05	.92	1.20	2⅝

No. 133

Open Pattern Malleable Return Bends

Size Inches	Right-Hand Black Each	Right-Hand Galv. Each	Right and Left Black Each	Right and Left Galv. Each	Center to Center Inches
½	$.19	$.25	$.22	$.29	1½
¾	.22	.29	.26	.34	2
1	.29	.38	.34	.44	2½
1¼	.44	.57	.51	.66	3
1½	.62	.80	.70	.90	3½
2	1.00	1.30	1.15	1.50	4
2½	1.45	1.90	1.65	2.15	4½
3	2.15	2.80	2.45	3.20	5
4	5.80	7.55	....	....	6

Malleable Reducers

No. 123

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.05	$.07	2	$.28	$.36
⅜	.05	.07	2½	.50	.65
½	.06	.08	3	.75	1.00
¾	.09	.12	3½	1.10	1.45
1	.12	.16	4	1.40	1.85
1¼	.15	.20	5	2.50	3.25
1½	.18	.23	6	3.60	4.70

Malleable Caps

No. 125

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
¼	$.03	$.04	2	$.25	$.33
⅜	.04	.05	2½	.40	.52
½	.05	.07	3	.60	.78
¾	.08	.10	3½	.80	1.05
1	.10	.13	4	1.10	1.45
1¼	.13	.17	5	1.80	2.35
1½	.18	.23	6	2.70	3.50

Malleable Waste Nuts

No. 126

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.03	$.04	1	$.06	$.08
¼	.03	.04	1¼	.11	.14
⅜	.04	.05	1½	.25	.33
½	.04	.05	2	.41	.53
¾	.05	.07	...	...	...

Cast Iron Floor Flanges

Not Faced, Countersunk Holes for Screws

No. 340

Size, In.	Each	Size, In.	Each
¼x2¹³⁄₁₆	$.10	1 x4	$.16
⅜x3	.10	1¼x4	.16
½x3½	.15	1½x4½	.22
¾x3½	.15	2 x5½	.35

Galvanized take double list.

Malleable Locknuts

No. 127

Sizes 5 to 12-inch, use cast iron.

Size In.	Black Each	Galv. Each	Size In.	Black Each	Galv. Each
⅛	$.02	$.03	1½	$.10	$.13
¼	.02½	.03½	2	.12	.16
⅜	.02½	.03½	2½	.30	.39
½	.03	.04	3	.38	.50
¾	.04	.05	3½	.43	.56
1	.06	.08	4	.48	.62
1¼	.08	.10	...	...	...

Malleable Shoulder Bushings

No. 135

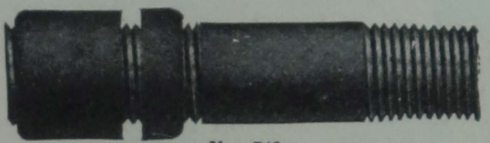
Size In.	Each Black	Each Galv.	Size In.	Each Black	Each Galv.
¼	$.04	$.08	1¼	$.07	$.14
⅜	.04	.08	1½	.09	.18
½	.04	.08	2	.14	.28
¾	.05	.10	2½	.21	.42
1	.06	.12	3	.30	.60

Malleable Faced Bushings

Size In.	Each Black	Each Galv.	Size In.	Each Black	Each Galv.
¼	$.08	$.12	3	$.70	$1.05
⅜	.08	.12	3½	1.20	1.80
½	.09	.14	4	1.50	2.25
¾	.11	.17	5	2.60	3.90
1	.13	.20	6	3.75	5.60
1¼	.17	.25	8	9.00	13.50
1½	.22	.33	10	14.00	21.00
2	.32	.48	12	20.00	30.00
2½	.48	.72	....	.....	.....

Malleable Bushings Reduce One Size Only
No. 136

Long Screws



No. 741

Furnished with coupling and locknut faced. Long screws, longer than standard, furnished on special order and charged as cut pipe, with threads, couplings and locknuts extra.

Size Pipe Inches	Standard Length In.	Price, Each Black	Price, Each Galv.	Size Pipe Inches	Standard Length In.	Price, Each Black	Price, Each Galv.
¼	2½	$.30	$.35	1½	5½	$1.30	$1.60
⅜	3	.35	.40	2	6	1.70	2.10
½	3½	.40	.50	2½	7	2.70	3.10
¾	4	.55	.66	3	8	3.70	4.70
1	4½	.75	1.00	3½	8½	5.40	6.50
1¼	5	1.00	1.25	4	9	6.60	7.75

In ordering, specify length of thread wanted.

Walworth Faced Locknuts and Couplings

Faced Locknut

Faced Coupling

Locknuts are malleable iron. Couplings, sizes 2-inch and smaller are malleable iron, sizes 2½ to 6-inch are wrought.

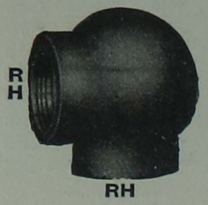
Faced Locknuts

Size In.	No. 7179 Black Each	No. 7579 Galv. Each	Size In.	No. 7179 Black Each	No. 7579 Galv. Each	Size In.	No. 7179 Black Each	No. 7579 Galv. Each
¼	$.08	$.11	1	$.15	$.22	2½	$.35	$.50
⅜	.09	.13	1¼	.20	.30	3	.45	.65
½	.10	.15	1½	.25	.35	...	...	...
¾	.12	.18	2	.30	.45	...	...	...

Faced Couplings

Size In.	No. 7180 Black Each	No. 7580 Galv. Each	Size In.	No. 7180 Black Each	No. 7580 Galv. Each	Size In.	No. 7180 Black Each	No. 7580 Galv. Each
¼	$.09	$.14	1¼	$.30	$.45	3½	$1.20	$1.80
⅜	.10	.15	1½	.40	.60	4	1.50	2.25
½	.12	.18	2	.50	.75	5	2.40	....
¾	.16	.24	2½	.70	1.00	6	3.60	....
1	.22	.33	3	.90	1.35	...	....	....

Malleable Iron Ball Pattern Railing Fittings

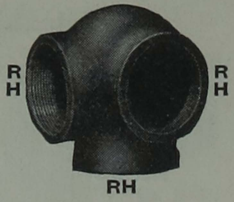


No. 1 Elbows

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.10	$.13	2	$.44	$.57
¾	.12	.15	2½	1.00	1.30
1	.14	.18	3	2.00	2.60
1¼	.22	.29	4	3.75	4.90
1½	.30	.39	...	....	....

No. 2 90° Side Outlet Elbows

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.19	$.25	2	$.88	$1.15
¾	.23	.30	2½	2.00	2.60
1	.28	.36	3	3.35	4.35
1¼	.44	.57	4	6.10	8.00
1½	.60	.78	...	....	....



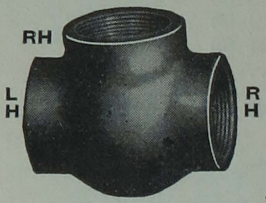
No. 11 45° Side Outlet Elbows

Size In.	Black Each	Galv. Each
1	$.40	$.52
1¼	.60	.78
1½	.80	1.05
2	1.20	1.55

45° Side Outlet Tees

No. 12 One L.H. Thrd. on Run
No. 12½ All R.H. Threads

Size In.	Black Each	Galv. Each
1	$.55	$.72
1¼	.80	1.05
1½	1.05	1.38
2	1.60	2.10



Tees

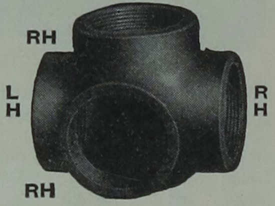
No. 3—As Illustrated
No. 3½—All R.H. Threads

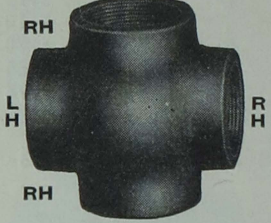
Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.13	$.17	2	$.57	$.75
¾	.16	.21	2½	1.30	1.70
1	.19	.25	3	2.60	3.40
1¼	.28	.36	4	4.90	6.40
1½	.40	.52	...	....	....

90° Side Outlet Tees

No. 4—As Illustrated
No. 4½—All R.H. Threads

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.25	$.33	2	$1.15	$1.50
¾	.31	.40	2½	2.60	3.40
1	.37	.48	3	5.00	6.50
1¼	.57	.75	4	8.25	10.75
1½	.80	1.05	...	....	.....





Crosses

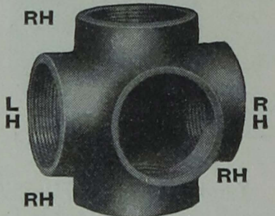
No. 5—As Illustrated
No. 5½—All R.H. Threads

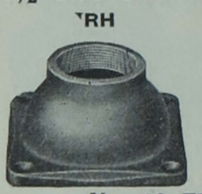
Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.18	$.23	2	$.77	$1.00
¾	.21	.27	2½	1.75	2.30
1	.25	.33	3	3.40	4.45
1¼	.38	.49	4	6.30	8.20
1½	.53	.70	...	....	....

Side Outlet Crosses

No. 6—R. H.
No. 6½—As Illustrated

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.32	$.42	2	$1.45	$1.90
¾	.38	.50	2½	3.15	4.10
1	.46	.60	3	6.00	7.80
1¼	.70	.91	4	10.00	13.00
1½	1.00	1.30	...	.....	.....





No. 7 Square Floor Flanges

Size Inches	Black Each	Galv. Each	Size Inches	Black Each	Galv. Each
½	$.12	$.16	2	$.80	$1.05
¾	.16	.21	2½	1.55	2.00
1	.20	.26	3	2.75	3.60
1¼	.34	.44	4	5.00	6.50
1½	.50	.65	...	....	....

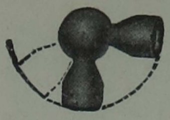
No. 10 Floor Flanges with Long Base

Size In.	Black Each	Galv. Each
1	$.37	$.48
1¼	.52	.68
1½	.70	.90
2	1.10	1.45

Fittings tapped as shown, or r.h. on all openings when so specified, at regular prices; tapped otherwise at an advance in price.

Fittings reamed for slip joint—prices upon application.

Malleable Iron Adjustable Railing Fittings



No. 70 Female Elbows

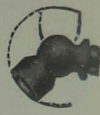
All R. H. Threads

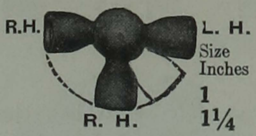
Size Inches	Each	Size Inches	Each
1	$1.10	1½	$1.70
1¼	1.25	2	2.25

No. 70½ Male and Female Elbows

All R. H. Threads

Size Inches	Each	Size Inches	Each
1	$.80	1½	$1.20
1¼	.90	2	1.65





Tees

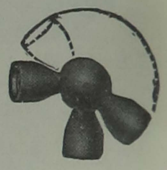
No. 71 All R. H. Threads
No. 71½ As Illustrated

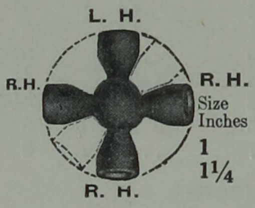
Size Inches	Each	Size Inches	Each
1	$1.30	1½	$2.00
1¼	1.50	2	2.50

No. 72 Stair Landing Tees

All R. H. Threads

Size Inches	Each	Size Inches	Each
1	$1.30	1½	$2.15
1¼	1.60	2	2.50





Crosses

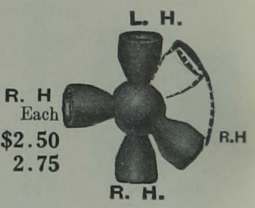
No. 73 All R. H. Threads
No. 73½ As Illustrated

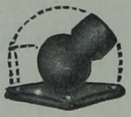
Size Inches	Each	Size Inches	Each
1	$1.50	1½	$2.35
1¼	1.75	2	2.75

Stair Landing Crosses

No. 74 All R. H. Threads
No. 74½ As Illustrated

Size Inches	Each	Size Inches	Each
1	$1.50	1½	$2.50
1¼	1.85	2	2.75





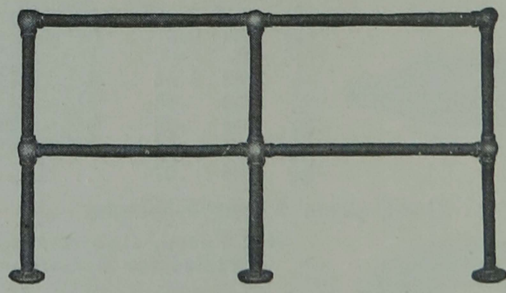
No. 79 Flanges

R. H. Threads

Size Inches	Each	Size Inches	Each
1	$1.65	1½	$1.90
1¼	1.75	2	2.50

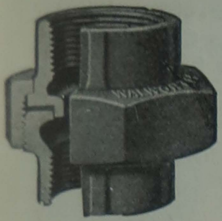
Add 50 per cent to above prices for galvanized railing fittings.

Pipe Railings



Plain, 2 Sections, 2 Rail Railing

Customers are invited to submit sketch or blue print showing any arrangement of railing desired, and we shall be pleased to quote prices on all material ready for erection.



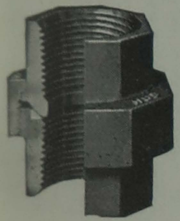
Walworth Malleable Unions

With Lip and Gasket

150 Pounds Working Steam Pressure

Size Inches	Each No. 7701 Black Female	Each No. 7751 Galv. Female	Size Inche	Each No. 7701 Black Female	Each No. 7751 Galv. Female
1/8	$.18	$.27	1 1/2	$.58	$.90
1/4	.18	.27	2	.75	1.15
3/8	.20	.30	2 1/2	1.55	2.35
1/2	.22	.33	3	2.10	3.15
3/4	.27	.40	3 1/2	3.65	5.50
1	.33	.50	4	4.35	6.50
1 1/4	.46	.70	...	....	....

Hub Malleable Iron Unions



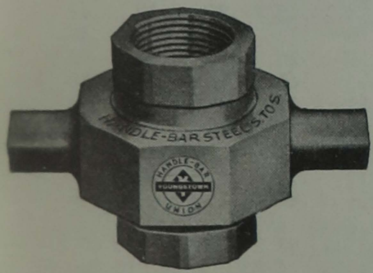
150 Pounds Working Steam Pressure

Made of the best grade of malleable iron.

Illustration shows No. 7712 hub union, ground joint, with inserted bronze seat.

Size In.	Each No. 7712 Black	Each No. 7762 Galv.	Size In.	Each No. 7712 Black	Each No. 7762 Galv.	Size In.	Each No. 7712 Black	Each No. 7762 Galv.
1/8	$.30	$.45	3/4	$ .60	$.90	2	$2.00	$3.00
1/4	.30	.45	1	.80	1.20	2 1/2	3.20	4.80
3/8	.40	.60	1 1/4	1.20	1.80	3	4.80	7.20
1/2	.50	.75	1 1/2	1.60	2.40	...	....	....

Forged Steel Unions



Completely rust-proofed. Designed for all services where connections are broken frequently; for permanent lines where flanges and flange unions were formerly used; for oil loading racks, hose connections, pump unions, steam trap unions. Will last four times longer on steam traps because threads will not gall, and can be tightened and loosened with a hammer without crushing nut or ends.

Guaranteed for the following services; Ammonia and all refrigeration work, chemicals, acids and process lines, hot oils and gases, gasoline, super-heated steam, air and water.

Made in the following styles:

Handle-bar, steel to steel, brass to steel, and brass to brass.

Petro, steel to steel seat.

Hydro, brass to brass seat.

Mark, brass to steel seat.

In ordering specify style desired.

Size Inches	Black Each	Udylited Each	Width Across Nut Inches	Length Over All Inches	Bars End to End Inches	Weight Each
1/8	$.30	$.45	1 1/8	1 33/64	1 7/8	6 Oz.
1/4	.30	.45	1 1/4	1 41/64	2	8 Oz.
3/8	.40	.60	1 1/2	1 7/8	2 3/8	10 Oz.
1/2	.50	.75	1 3/4	1 15/16	3	12 Oz.
3/4	.60	.90	2 1/16	2 1/4	3 1/2	1 Lb. 2 Oz.
1	.80	1.20	2 7/16	2 15/32	4 1/4	1 Lb. 12 Oz.
1 1/4	1.20	1.80	2 15/16	2 25/32	5	2 Lbs. 5 Oz.
1 1/2	1.60	2.40	3 9/32	3 1/32	5 3/4	3 Lbs. 2 Oz.
2	2.00	3.00	4 1/32	3 13/32	6 3/4	5 Lbs. 2 Oz.
2 1/2	4.50	6.00	4 3/4	4 1/32	8	8 Lbs. 2 Oz.
3	6.75	9.00	5 3/4	4 3/8	10	14 Lbs. 2 Oz.

Walco Malleable Iron Unions

Bronze to Iron Seat

For 250 Pounds Working Steam Pressure—3 Inches and Smaller
For 200 Pounds Working Steam Pressure—3 1/2 and 4 Inches

Recommended for use on lines carrying hazardous liquids. With American Standard Pipe Threads with the ends countersunk to permit of easy starting of the pipe.

Bronze seat ring is forced into a recess in the iron end of the union under high pressure, making the bronze mechanically integral with the iron.

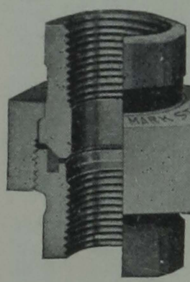
Size In.	Each No. 7715 Black	Each No. 7765 Galv.	Size In.	Each No. 7715 Black	Each No. 7765 Galv.
1/4	$.30	$.45	1 1/2	$1.60	$2.40
3/8	.40	.60	2	2.00	3.00
1/2	.50	.75	2 1/2	3.20	4.80
3/4	.60	.90	3	4.80	7.20
1	.80	1.20	3 1/2	8.00	12.00
1 1/4	1.20	1.80	4	10.00	15.00

Mark Regular Forged Steel Unions

Brass to Steel Seat

For 2000 Pounds Cold Working Pressure and 400 Pounds Steam at 600° F.

Heavy walls and nut. New seat construction with 3 side contact, one side of steel wall rolled into frictional engagement with brass ring.



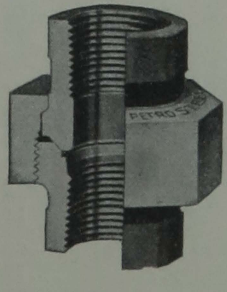
Size In.	Black Each	Udylited Each	Width Across Nut In.	Lgth. Overall In.	Wt. Lbs.
1/8	$.30	$.45	1 1/8	1 33/64	1/4
1/4	.30	.45	1 1/4	1 41/64	5/16
3/8	.40	.60	1 1/2	1 7/8	1/2
1/2	.50	.75	1 3/4	1 15/16	5/8
3/4	.60	.90	2 1/16	2 1/4	15/16
1	.80	1.20	2 7/16	2 15/32	1 7/16
1 1/4	1.20	1.80	2 15/16	2 25/32	2
1 1/2	1.60	2.40	3 9/32	3 1/32	2 13/16
2	2.00	3.00	4 1/32	3 13/32	4 13/16
2 1/2	4.50	6.00	4 3/4	4 1/32	7 7/16
3	6.75	9.00	5 3/4	4 3/8	12 1/4

Petro Regular Forged Steel Unions

Steel to Steel Seat

For 2000 Pounds Cold Working Pressure and 1000° F. Heat Under 400 Pounds Working Pressure

A high pressure, high heat-resisting all steel union for use in oil fields, oil refineries, etc. Approved for all hazardous liquids.



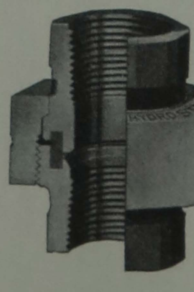
Size In.	Black Each	Udylited Each	Width Across Nut In.	Lgth. Overall In.	Wt. Lbs.
1/8	$.30	$.45	1 1/8	1 33/64	1/4
1/4	.30	.45	1 1/4	1 41/64	5/16
3/8	.40	.60	1 1/2	1 7/8	1/2
1/2	.50	.75	1 3/4	1 15/16	5/8
3/4	.60	.90	2 1/16	2 1/4	15/16
1	.80	1.20	2 7/16	2 15/32	1 7/16
1 1/4	1.20	1.80	2 15/16	2 25/32	2
1 1/2	1.60	2.40	3 9/32	3 1/32	2 13/16
2	2.00	3.00	4 1/32	3 13/32	4 13/16
2 1/2	4.50	6.00	4 3/4	4 1/32	7 7/16
3	6.75	9.00	5 3/4	4 3/8	12 1/4

Hydro Regular Forged Steel Unions

Brass to Brass Seat

For 2000 Pounds Cold Working Pressure and 400 Pounds Steam at 600° F.

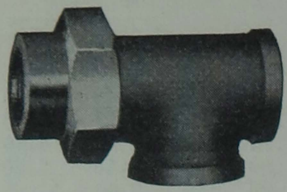
Two brass seats are better suited for service where corrosion is factor to consider. Heat up to 1000° F. will not distort or loosen seats.



Size In.	Black Each	Udylited Each	Width Across Nut In.	Lgth. Overall In.	Wt. Lbs.
1/8	$.30	$.45	1 1/8	1 33/64	1/4
1/4	.30	.45	1 1/4	1 41/64	5/16
3/8	.40	.60	1 1/2	1 7/8	1/2
1/2	.50	.75	1 3/4	1 15/16	5/8
3/4	.60	.90	2 1/16	2 1/4	15/16
1	.80	1.20	2 7/16	2 15/32	1 7/16
1 1/4	1.20	1.80	2 15/16	2 25/32	2
1 1/2	1.60	2.40	3 9/32	3 1/32	2 13/16
2	2.00	3.00	4 1/32	3 13/32	4 13/16
2 1/2	4.50	6.00	4 3/4	4 1/32	7 7/16
3	6.75	9.00	5 3/4	4 3/8	12 1/4

Malleable Iron Union Tees

Male

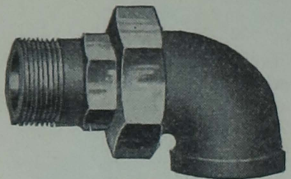


Female

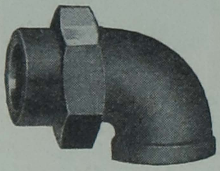
Gaskets Extra

Size In.	Male Black Each	Male Galv. Each	Female Black Each	Female Galv. Each
¼	$.48	$.72	$.40	$.60
⅜	.50	.75	.43	.65
½	.52	.78	.45	.68
¾	.65	1.00	.57	.86
1	.80	1.20	.70	1.05
1¼	1.10	1.65	.95	1.45
1½	1.30	1.95	1.15	1.75
2	1.95	2.95	1.70	2.55
2½	3.70	5.55	3.20	4.80
3	6.00	9.00	5.15	7.75

Malleable Iron Union Elbows



Male

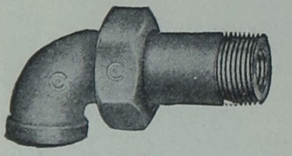


Female

Gaskets Extra

Size In.	Male Black Each	Male Galv. Each	Female Black Each	Female Galv. Each
¼	$.43	$.65	$.38	$.57
⅜	.45	.70	.40	.60
½	.48	.72	.42	.63
¾	.62	.93	.54	.81
1	.72	1.08	.63	.95
1¼	1.05	1.60	.90	1.35
1½	1.20	1.80	1.05	1.58
2	1.80	2.70	1.55	2.35
2½	3.30	4.95	2.85	4.30
3	5.25	7.90	4.50	6.75

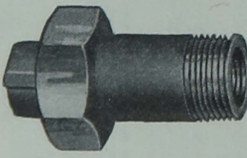
Malleable Iron Boiler Elbows



No. 586

Size, Male and Female Inches	No. 587 Plain Galv. Each	No. 586 With Union Galv. Each
¾x¾x1	$.40	$.75
¾x½x1	.40	.75
½x½x1	.40	.60
¾x½x¾	...	.75
½x½x¾	...	.60

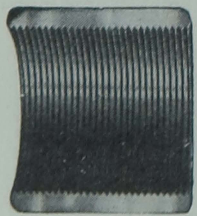
Malleable Iron Boiler Couplings



No. 589, with Union

Size, Male and Female Inches	No. 588 Plain Galv. Each	No. 589 With Union Galv. Each
¾x¾x1	$.40	$.75
¾x½x1	.40	.75
½x½x1	.40	.60
¾x½x¾	...	.75
½x½x¾	...	.60

Standard Pipe Couplings



No. 713

Size Pipe Inches	R.H. Black Each	R.H. Galv. Each	R.& L. Black Each	Nom. Outside Diam. Inches	Length Inches
⅛	$.05	$.06	....	.594	⅞
¼	.05	.06	$.07	.750	1
⅜	.06	.08	.08	.906	1⅛
½	.07	.10	.11	1.063	1⅜
¾	.10	.13	.15	1.297	1½
1	.13	.18	.20	1.563	1¾
1¼	.17	.25	.25	1.969	2⅛
1½	.21	.32	.30	2.234	2 5/16
2	.28	.40	.50	2.719	2 9/16
2½	.40	.55	.85	3.313	2⅞
3	.60	.80	1.20	3.938	3 1/16
3½	.80	1.05	1.60	4.438	3 7/16
4	1.00	1.40	2.00	4.938	3 7/16

Sizes 4½ to 12 inches can be furnished to order.
Prices on application.

Rough Brass Screwed Fittings

M. I. Pattern, Iron Pipe Size

For 125 Pounds Steam Working Pressure

No. 625
90° Elbow

No. 626
45° Elbow

No. 627
Tee

No. 628 Y Bend

No. 629, Cross

Price, Each

Size.......inches	⅛	¼	⅜	½	¾	1	1¼
Elbows 90°...........	$.12	$.15	$.20	$.28	$.40	$.63	$.90
Elbows Reducing.......	*	.19	.25	.35	.50	.80	1.10
Elbows 45°...........	.16	.20	.25	.31	.40	.63	.90
Elbows, Street 90°......	.25	.27	.33	.48	.63	.85	1.50
Elbows, Street 45°......	.25	.32	.38	.51	.65	.85	1.50
Elbows, Drop, Female...	...	...	.35	.45	.65	1.05	....
Elbows, Side Outlet.....	...	.45	.60	.85	1.20	1.90	2.75
Tees.................	.17	.21	.28	.40	.55	.85	1.25
Tees, Reducing.........	*	.25	.35	.50	.70	1.05	1.55
Tees, Service..........	...	...	.45	.65	.90	1.35	1.95
Tees, Drop, Plain.......	...	...	.43	.57	.80	1.25	....
Tees, 4-Way..........	...	.75	.90	1.20	1.65	2.50	3.75
Crosses..............	.25	.30	.40	.55	.80	1.25	1.80
Crosses, Reducing......	*	.38	.50	.70	1.00	1.55	2.25
Bushings, Hexagon.....	...	.10	.12	.15	.22	.35	.50
Bushings, Face.........	...	.12	.15	.19	.27	.44	.62
Plugs, Regular.........	.08	.10	.12	.15	.20	.30	.45
Plugs, Solid..........	.08	.10	.12	.22	.30	.45	.80
Plugs Countersunk.....	...	...	...	.22	.30	.45	.65
Caps................	.10	.13	.16	.20	.30	.42	.60
Locknuts.............	.10	.10	.12	.15	.20	.28	.40
Reducers.............	...	.15	.20	.28	.40	.60	.90
Ext. Pieces...........	...	...	.40	.55	.80	1.20	1.80
Couplings............	.10	.13	.17	.25	.37	.55	.80
Couplings, R. and L.....	.13	.17	.22	.30	.45	.70	1.00
Return Bends, Closed...	...	...	...	.70	1.00	1.25	1.80
Return Bends, Open....	...	...	...	.80	1.10	1.40	2.15
Y Bends..............	...	...	.60	.75	1.10	1.65	2.50

Size.......inches	1½	2	2½	3	3½	4
Elbows, 90°...........	$1.20	$2.00	$3.50	$6.00	$8.00	$10.00
Elbows, Reducing.......	1.50	2.50	4.25	7.50	10.00	12.50
Elbows, 45°...........	1.20	2.00	3.50	6.00	8.00	10.00
Elbows, Street 90°......	2.00	3.25	6.00	10.00	14.00	17.50
Elbows, Street 45°....	2.00	3.25	.....	.....	.....	.....
Elbows, Side Outlet.....	3.60	6.00	10.50	18.00	.....	.....
Tees................	1.70	2.80	5.00	8.50	11.00	14.00
Tees, Reducing.........	2.10	3.50	6.25	10.50	14.00	17.50
Tees, Service..........	2.65	4.40	.....	.....	.....	.....
Tees 4-Way...........	5.00	8.50	.....	.....	.....	.....
Crosses..............	2.40	4.00	7.00	12.00	16.00	20.00
Crosses, Reducing......	3.00	5.00	8.75	15.00	20.00	25.00
Bushings Hexagon.....	.70	1.00	1.50	2.50	3.75	5.00
Bushings, Face.........	.87	1.25	1.85	3.10	4.75	6.25
Plugs Regular.........	.60	.95	1.50	2.25	3.75	5.00
Plugs, Solid..........	1.20	1.90	3.00	4.50	7.50	10.00
Plugs, Countersunk.....	.90	1.40	2.25	4.00	5.00	7.00
Caps................	.80	1.25	2.50	3.50	5.50	7.00
Locknuts.............	.55	.80	1.75	2.75	4.00	5.00
Reducers.............	1.10	1.75	2.75	4.00	6.00	8.00
Ext. Pieces...........	2.40	3.25	.....	.....	.....	.....
Couplings............	1.00	1.60	2.50	3.50	5.25	7.00
Couplings, R. and L.....	1.30	2.00	3.10	4.50	.....	.....
Return Bends, Closed...	2.50	4.25	.....	.....	.....	.....
Return Bends, Open....	3.00	4.75	8.25	11.00	.....	.....
Y Bends..............	3.30	5.50	9.50	16.00	.....	26.00

Right and left elbows and right and left return bends furnished at an advance of 25 per cent over above list.

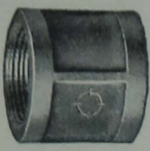
*Elbows, tees, crosses, bushings and reducers, reducing more than two sizes, will be furnished at an advance of 25 per cent over above reducing list prices.

Walworth Standard Brass Flat Band Rough Couplings

Iron Pipe Size

For 125 Lbs. Working Steam Pressure; 175 Lbs. Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures, Air Tested

Right Hand


Right and Left

Reducing

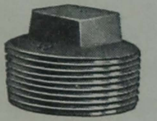
Right-hand couplings have two ribs, right and left, four ribs.

Size In.	No. 3423 R.H. Each	No. 3424 R. & L. Each	No. 3425 Red. Each	Size In.	No. 3423 R.H. Each	No. 3424 R.& L. Each	No. 3425 Red. Each
⅛	$.10	....	....	2	$1.60	$2.00	$1.75
¼	.13	$.17	$.15	2½	2.50	3.10	2.75
⅜	.17	.22	.20	3	3.50	4.50	4.00
½	.25	.30	.28	3½	5.25	....	6.00
¾	.37	.45	.40	4	7.00	....	8.00
1	.55	.70	.60	5	15.00	....	19.00
1¼	.80	1.00	.90	6	23.00	....	29.00
1½	1.00	1.30	1.10	8	48.00	....	60.00

No. 3430 Walworth Standard Brass Rough Plugs

Iron Pipe Size

For 125 Lbs. Working Steam Pressure; 175 Lbs. Non-Shock Working Oil, Water or Gas Pressures, at Ordinary Air Temperatures



Size In.	Each	Size In.	Each	Size In.	Each	Size In.	Each
⅛	$.08	¾	$.20	2	$.95	4	$5.00
¼	.10	1	.30	2½	1.50	5	8.00
⅜	.12	1¼	.45	3	2.25	6	12.00
½	.15	1½	.60	3½	3.75	8	30.00

Walworth Standard Brass Rough Bushings

Iron Pipe Size

For 125 Lbs. Working Steam Pressure; 175 Lbs. Non-Shock Working Oil, Water or Gas Pressures at Ordinary Air Temperatures

No. 3428 Bushing

No. 3429, Face Bushing

Size In.	No. 3428 Each	No. 3429 Each	Size In.	No. 3428 Each	No. 3429 Each
¼	$.10	$.12	2½	$1.50	$1.85
⅜	.12	.15	3	2.50	3.10
½	.15	.19	3½	3.75	4.75
¾	.22	.27	4	5.00	6.25
1	.35	.44	5	12.00	....
1¼	.50	.62	6	18.00	....
1½	.70	.87	8	35.00	....
2	1.00	1.25	...	.....	....

Pipe fittings for high temperatures and high pressure can be furnished.

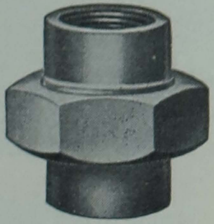
Tell us your needs. Prices and information will be cheerfully sent to you.

Standard Brass Unions

Ground Joints

For 150 Pounds Steam Working Pressure

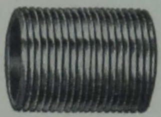
Size In.	Each				
	Rough	Semi-Fin.	Polished	N. P.	C. P.
⅛	$.40	$.45	$.50	$.60	$.75
¼	.50	.55	.60	.72	.90
⅜	.65	.75	.85	1.02	1.28
½	.85	.95	1.05	1.25	1.57
¾	1.15	1.30	1.40	1.68	2.10
1	1.60	1.75	1.90	2.28	2.85
1¼	2.25	2.50	2.75	3.30	4.13
1½	2.70	3.00	3.25	3.90	4.88
2	4.00	4.50	5.00	6.00	7.50
2½	7.50	8.25	9.00	10.80	13.50
3	11.50	12.75	14.00	16.80	21.00
3½	.....	22.50	25.00	30.00	37.50
4	.....	30.00	33.00	39.50	49.38

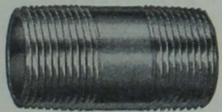

No. 655

Prices for acid-resisting metal upon application.

Brass Nipples

Iron Pipe Size


Close
No. 652


Shoulder or Short
No. 653

The term "short nipples" is used to describe nipples of the next size longer than "close".

"Shoulder nipples" is understood to have the same meaning as "short."

"Space nipples" and "long nipples" describe nipples longer than the short or shoulder nipples.

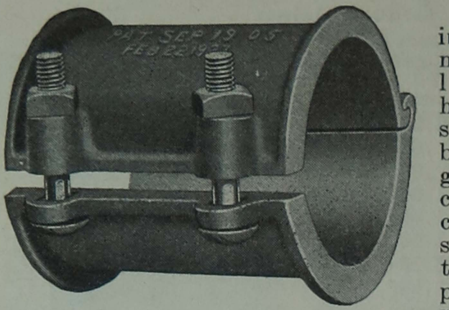
Length Inches	Each						
	Diameter, Inches						
	⅛	¼	⅜	½	¾	1	1¼
¾	$.11	....	....	....	....	....	....
⅞	....	$.13	....	....	....	....	....
1	....	....	$.15	....	....	....	....
1⅛	....	....	....	$.23	....	....	....
1⅜	....	....	....	....	$.28	....	....
1½	.13	.16	.19	.25	....	$.37	....
1⅝	....	....	....	....	....	....	$.60
2	.15	.19	.23	.30	.35	.44	....
2½	.17	.22	.27	.35	.42	.53	.75
3	.19	.25	.31	.40	.49	.62	.88
3½	.21	.28	.35	.45	.56	.71	1.01
4	.23	.31	.39	.50	.63	.80	1.14
4½	.25	.34	.43	.55	.70	.89	1.27
5	.27	.37	.47	.60	.77	.98	1.40
5½	.29	.40	.51	.65	.84	1.07	1.53
6	.31	.43	.55	.70	.91	1.16	1.66

Length Inches	Each					
	Diameter, Inches					
	1½	2	2½	3	3½	4
1¾	$.70	....	....	....	....	....
2	....	$1.00	....	....	....	....
2½	.90	1.20	$1.70	....	....	....
2⅝	....	....	....	$2.50	....	....
2¾	....	....	....	....	$4.00	....
2⅞	....	....	....	....	....	$4.75
3	1.05	1.40	2.00	2.90	....	....
3½	1.20	1.60	2.30	3.30	....	....
4	1.35	1.80	2.60	3.70	5.40	6.15
4½	1.50	2.00	2.90	4.10	6.00	6.85
5	1.65	2.20	3.20	4.50	6.60	7.55
5½	1.80	2.40	3.50	4.90	7.20	8.25
6	1.95	2.60	3.80	5.30	7.80	8.95

Extras to be Added to the Above List

Red Brass..........	25%	Polished............	50%
Copper.............	25%	Nickel Plated.......	75%
Extra Heavy........	100%	Chromium Plated...	100%
Right and Left......	50%	Tinned.............	75%

Emergency Pipe Clamps



For stopping leaks in pipe lines. It is a malleable iron cylinder, halved, hinged along one side and fitted with bolts on the other. A gasket completes the clamp. It is by concentration of pressure on the leak that this clamp makes a positive permanent repair.

Owing to the long open hinge, the two halves of the clamp may be slid together along the pipe so as to assemble the clamp when crowded for room.

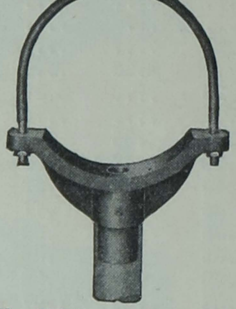
Packed 12 to a carton, ½ to 2-inch sizes, and 6 to a carton, 2½ to 4-inch sizes. For the larger sizes of pipe, clamps are reinforced with heavy ribs, which insure security under high pressure. Specify when O.D. or cast iron pipe sizes.

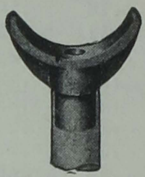
Size Pipe In.	Lgth. Overall In.	Wt., Lbs. per Doz.	Price Each	Size Pipe In.	Lgth. Overall In.	Wt., Lbs. per Doz.	Price Each
½	3¼	10	$.60	1½	4	23	$1.05
¾	3¼	13	.68	2	4¼	32	1.20
1	3½	15	.75	2½	4½	39	1.50
1¼	3¾	20	.90	3	5	51	1.88

Size Pipe In.	Lgth. Overall In.	No. Bolts	Wt. Lbs.	Price Each	Size Pipe In.	Lgth. Overall In.	No. Bolts	Wt. Lbs.	Price Each
3½	5½	2	6	$2.25	8	9½	3	30	$12.00
4	6	2	7½	3.00	*8	9½	3	32	12.00
*4	6½	2	8½	5.25	9	10	3	34	13.50
4½	6½	2	8½	5.25	10	12	4	45	15.00
5	7	3	10	7.50	*10	12	4	48	15.00
6	8	3	14	9.00	12	12	4	57	18.00
*6	8	3	15	9.00	*12	12	4	59	18.00
7	9	3	18	10.50	...	....	.	..	......

*Cast iron.

Grinnell Pipe Supports


No. 258 Saddle Support


No. 259 Stanchion Saddle

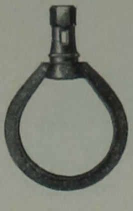
Pipe Size In.	No. 258 per 100	No. 259 per 100	Riser Pipe Size In.	Base Flange Diam. In.
4	$170.00	$580.00	3	9
5	190.00	600.00	3	9
6	250.00	620.00	3	9
8	305.00	780.00	3	9
10	365.00	920.00	3	9
12	425.00	1100.00	3	9
14 O.D.	740.00	1660.00	4	11
16 O.D.	950.00	1920.00	4	11
18 O.D.	1200.00	2120.00	4	11
20 O.D.	2500.00	3700.00	6	13½
24 O.D.	3600.00	5300.00	6	13½
30 O.D.	4800.00	7000.00	6	13½
36 O.D.	7200.00	....	8	16

Prices cover only the cast iron pipe saddle support and the cast iron pipe stanchion saddle with yoke and nuts, as shown.

Prices on the riser pipe and reducing flange on application.

No. 101 Grinnell Pipe Hangers

Solid Adjustable Swivel Ring
Malleable Iron



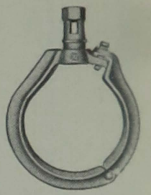
The ring can be used with coach screw rod or with machine threaded rod in connection with practically any type of ceiling flange expansion case, insert, etc.

The unusual feature of this ring is the swivel shank allowing an adjustment of about two inches by simply turning the nut on the shank to the left or right. Regularly furnished in black. Galvanized only on order.

Pipe Inches	Black Per 100	Galv. Per 100	Rod Inches	Pipe Inches	Black Per 100	Galv. Per 100	Rod Inches
¾	$24.40	$27.20	⅜	3	$54.00	$61.00	½
1	26.20	29.10	⅜	3½	56.00	65.00	½
1¼	27.00	30.00	⅜	4	71.00	84.00	⅝
1½	28.00	31.20	⅜	5	88.00	104.00	⅝
2	30.60	34.40	⅜	6	138.00	164.00	¾
2½	44.00	50.00	½	8	240.00	318.00	⅞

No. 104 Grinnell Pipe Hangers

Split Adjustable Swivel Ring—Malleable Iron

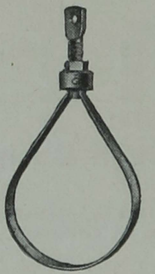


This ring can be used with coach screw rod or with machine threaded rod in connection with practically any type of ceiling flange expansion case, insert, etc.

The unusual feature of this ring is the swivel shank allowing an adjustment of about 2 inches by simply turning the nut on the shank to the left or right. The hinging of the ring is somewhat off center, which provides sufficient seating to hold the pipe before closing the ring. A wedge type pin is loosely but inseparably cast into hinged section for fastening this section after pipe is in place.

Size In.	Rod In.	Per 100	Size In.	Rod In.	Per 100	Size In.	Rod In.	Per 100
¾	⅜	$43.00	2	⅜	$60.00	4	⅝	$128.00
1	⅜	45.00	2½	½	70.00	5	⅝	176.00
1¼	⅜	48.00	3	½	80.00	6	¾	224.00
1½	⅜	54.00	3½	½	108.00	8	⅞	384.00

Grinnell Adjustable Wrought Ring Hangers and Pipe Rings


No. 95 Ring Hanger

No. 97 Pipe Ring

The copper plated rings and hangers are for use with copper pipe and fittings. Rings may be selected to fit snugly, eliminate vibration and present an attractive appearance.

Nos. 95 C.P. and 97 C.P. are copper plated.

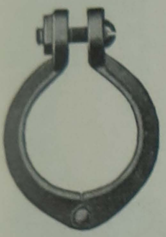
Nos. 95 and 97 are galvanized.

Pipe Size In.	No. 95 per 100	No. 97 per 100	No. 95 C.P. per 100	No. 97 C.P. per 100	Bolt Size In.	Vertical Adjustment In.
½	$20.50	$9.50	$28.80	$14.80	⅜	1⅛
¾	20.75	9.75	29.30	15.30	⅜	1⅛
1	21.00	10.00	29.80	15.80	⅜	1⅛
1¼	21.25	10.25	30.30	16.30	⅜	1⅛
1½	21.50	10.50	30.80	16.80	⅜	1 3/16
2	22.00	11.00	31.75	17.75	⅜	1⅛
2½	30.50	16.50	49.50	29.00	½	1¼
3	31.50	17.50	51.00	30.50	½	1 5/16
3½	32.00	18.00	52.50	32.00	½	1 5/16
4	51.00	33.00	93.00	63.00	⅝	1 11/16
5	54.00	36.00	100.00	70.00	⅝	1 11/16
6	80.00	56.00	154.00	108.00	¾	2 3/16
8	163.00	91.00	292.00	186.00	⅞	2⅝

No. 108 Grinnell Split Pipe Rings

Malleable Iron

Regularly furnished in black. Galvanized only on order.



Pipe Size Inches	Black Per 100	Galv. Per 100	Center of Pipe to Center of Bolt, In.	Bolt Size Inches
½	$15.00	$16.00	15/16	¼x1
¾	17.00	18.00	1⅛	¼x1
1	18.00	19.50	1¼	¼x1
1¼	20.00	22.00	1 9/16	¼x1¼
1½	23.00	25.50	1 11/16	¼x1¼
2	25.00	28.00	2 1/16	¼x1¼
2½	32.00	36.00	2 5/16	¼x1¼
3	38.00	43.00	2¾	¼x1¼
3½	45.00	53.00	3⅛	5/16x1½
4	55.00	64.00	3½	⅜x2
5	75.00	92.00	4⅝	⅜x2
6	90.00	114.00	5⅜	½x2
8	160.00	208.00	6¼	½x2

Grinnell Malleable Iron Sockets

For Split Pipe Rings

No. 110, Tapped for Pipe Thread

Pipe Size....in.	½	¾	1	1¼	1½	2	2½
Pipe Thread.in.	⅛	⅛	⅛	¼	¼	¼	¼
No. 110 . per 100	$6.50	6.50	6.50	7.00	7.00	7.00	7.00
Pipe Size....in.	3	3½	4	5	6	8	....
Pipe Thread.in.	¼	⅜	⅜	½	½	½	¾
No. 110 . per 100	$7.00	8.50	8.50	13.00	13.00	13.00	18.00

No. 110-R, Tapped for Rod Thread

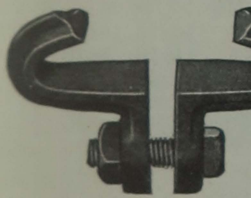
Pipe Size....in.	½	¾	1	1¼	1½	2	2½
Rod Thread.in.	⅜	⅜	⅜	⅜	⅜	⅜	½
No. 110-R per C	$6.50	6.50	6.50	6.50	6.50	6.50	....
Pipe Size....in.	3	3½	4	5	6	8	....
Rod Thread.in.	½	½	⅝	⅝	¾	⅞	....
No. 110-R per C	$7.00	7.00	8.50	8.50	13.00	18.00	....

No. 96 Grinnell Flattened End Bolts

No. 96 C.P. is copper-plated.

Bolt No.	No. 96 per 100	No. 96 C.P. per 100	Pipe Size In.	Bolt Size In.	Lgth. Thrd. In.	Lgth. Cen. Hole to End, In.	Size Hole In.
1	$11.00	$14.00	½–2	⅜	2	2⅞	9/32
2	14.00	20.50	2½–3½	½	2½	3⅜	11/32
3	18.00	30.00	4–5	⅝	3	4¼	13/32
4	24.00	46.00	6	¾	3¾	5	13/32
5	72.00	106.00	8	⅞	4½	6	17/32

No. 131 Grinnell I-Beam Clamps



Designed for use on American Standard I beams.

Malleable iron. Size bolt, ⅜ inch. Distance from bottom of beam to center bolt approximately 1¼ inches. Regularly furnished in black . Galvanized only on order.

Specify width of I-beam and space between halves of clumps.

Beam Flg. Width In.	Black Per 100	Galv. Per 100	Beam Flg. Width In.	Black Per 100	Galv. Per 100
2	$31.00	$36.00	4½	$40.00	$47.00
2½	33.00	38.00	5	43.00	51.00
3	36.00	42.00	5½	44.00	53.00
3½	38.00	45.00	6	53.00	62.00
4	39.00	46.00	...	.....	.....

Galvanized Pipe Straps

Size In.	Wt. Lbs. per 100	Per Lb.	Size In.	Wt. Lbs. per 100	Per Lb.
¼	2	$.30	1	7	$.30
⅜	3	.30	1¼	8½	.30
½	3¼	.30	1½	9	.30
¾	5	.30	2	11¼	.30

No. 2700 Adjustable Steel Pipe Hangers

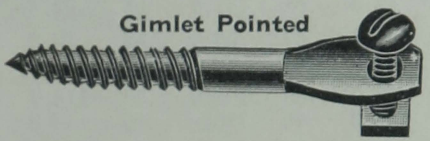
Size In.	Each	Size In.	Each	Size In.	Each
½	$.08	2	$.14	5	$.35
¾	.08	2½	.16	6	.40
1	.09	3	.18	8	.88
1¼	.10	3½	.20	10	1.35
1½	.12	4	.25	12	1.85

No. 2747 Extension Bars

No....................	10	11	13	14	15	16	17
No. 2747......per foot	$.08	.09	.11	.12	.20	.28	.40
Width...............in.	¾	⅞	1	1⅛	1¼	1¼	1¼

Grabler Pipe Hanger Lag Screws

Gimlet Pointed



No. 219, with Flattened Head

Size No..............	1	2	3	4	5
No. 219, with Bolt ....per 100	$7.50	9.00	13.00	21.00	27.00
Dimensions.........in.	5/16x3	⅜x4	½x5	⅝x5½	¾x6
For Pipe...........in.	½–1½	2–3	3½–6	8	10–12
Size Bolt..........in.	¼	¼	5/16	⅜	½

No. 20, with Threaded End

Size No......................	1	2	3	4
No. 20................per 100	$6.50	8.00	10.00	15.00
Dimensions................in.	⅜x3½	½x4	⅝x5	⅝x5
Size Pipe Thread..........in.	⅛	¼	⅜	½

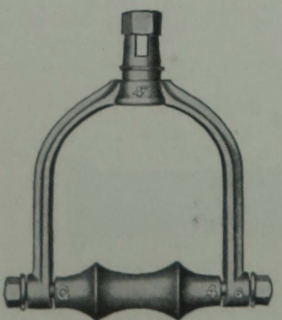
Cast Iron Hook Plates

No. 736 6-Hook

No. 737, Single Hook

	For Pipe, Inches			
	1	1¼	1½	2
	Center to Center, Inches			
No. of Hooks	2½ Each	3 Each	3½ Each	4½ Each
1	$.09	$.10	$.15	$.22
2	.18	.21	.28	.43
3	.23	.27	.43	.65
4	.26	.32	.58	.90
5	.32	.41	.72	1.15
6	.38	.52	.88	1.35

No. 174 Grinnell Adjustable Swivel Pipe Rolls



When No. 174 is to be used on line on which pipe covering is to be installed, order hangers two full sizes larger than pipe. This allows for installation of standard thickness covering.

*Pipe Size In.	Per 100	Pipe Size In.	Per 100
2½	$152.00	6	$410.00
3	155.00	7	475.00
3½	185.00	8	645.00
4	225.00	10	920.00
5	295.00	12	1250.00

*Size applies when pipe is not covered.

Cast Iron Water Pipe

Bell and Spigot

Standard Thickness and Weights of Cast Iron Pipe

	Class A Gas		**Class B Standard**		**Class C Medium Heavy**		**Class D Extra Heavy**	
	100-Ft. Head 43 Lbs. Press.		200-Ft. Head 86 Lbs. Press.		300-Ft. Head 130 Lbs. Press.		400-Ft. Head 173 Lbs. Press.	
Nom. I. D. In.	Thickness In.	Wt. Lbs. per Ft.	Thickness In.	Wt. Lbs. per Ft.	Thickness In.	Wt. Lbs. per Ft.	Thickness In.	Wt. Lbs. per Ft.
4	.42	20	.45	21.7	.48	23.3	.52	25
6	.44	30.8	.48	33.3	.51	35.8	.55	38.3
8	.46	42.9	.51	47.5	.56	52.1	.60	55.8
10	.50	57.1	.57	63.8	.62	70.8	.68	76.7
12	.54	72.5	.62	82.1	.68	91.7	.75	100
14	.57	89.6	.66	102.5	.74	116.7	.82	129.2
16	.60	108.3	.70	125	.80	143.8	.89	158.3
18	.64	129.2	.75	150	.87	175	.96	191.7
20	.67	150	.80	175	.92	208.3	1.03	229.2
24	.76	204.2	.89	233.3	1.04	279.2	1.16	306.7
30	.88	291.7	1.03	333.3	1.20	400	1.37	450
36	.99	391.7	1.15	454.2	1.36	545.8	1.58	625
42	1.10	512.5	1.28	591.7	1.54	716.7	1.78	825
48	1.26	666.7	1.42	750	1.71	908.3	1.96	1050
54	1.35	800	1.55	933.3	1.90	1141.7	2.23	1341.7
60	1.39	916.7	1.67	1104.2	2	1341.7	2.38	1583.3
72	1.62	1283.4	1.95	1545.8	2.39	1904.2	....	......
84	1.72	1633.4	2.22	2104.2	....	......	....	......

All lengths to lay 12 feet. All weights are approximate; those per foot include allowance for bell. All pipe is tested by water pressure. Turned and bored pipe made to order only.

Inquiries and orders should clearly indicate the approximate number of lengths or feet of pipe of each size and class required. Give the desired delivery point and time of shipment, with any particulars as to sizes required first, the service intended, etc. This will facilitate prompt attention and avoid delays.

Approximate Weights of Lead and Hemp Required for Joints

Pipe In.	Wt., Lbs. Lead	Wt., Lbs. Hemp	Pipe In.	Wt., Lbs. Lead	Wt., Lbs. Hemp	Pipe In.	Wt., Lbs. Lead	Wt., Lbs. Hemp
4	7.5	.21	**16**	30	.94	**42**	75.25	3.62
6	10.25	.31	**18**	33.8	1	**48**	85.5	4.37
8	13.25	.44	**20**	37	1.25	**54**	97.6	6.25
10	16	.53	**24**	44	1.50	**60**	108.3	8.25
12	19	.61	**30**	54.25	2.06	**72**	128	12.50
14	22	.81	**36**	64.75	3	**84**	147	15.00

Flanged

Flanged cast iron pipe, sizes 3 to 48 inches, same thickness as standard pipe. Thickness of flange equals approximately 1½ times thickness of pipe, plus ⅛ inch. Pipe made in 12-foot lengths and faced ⅛ inch short for gaskets.

Specials for Cast Iron Pipe

Class D

90° Quarter Bends

Size In.	Wt. Lbs.	Size In.	Wt. Lbs.
4	82	**16**	750
6	130	**18**	888
8	200	**20**	1070
10	278	**24**	1656
12	366	**30**	2836
14	504	**36**	4820

45° Eighth Bends

Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt. Lbs.
4	66	**12**	265	**20**	964
6	105	**14**	442	**24**	1515
8	150	**16**	558	**30**	2291
10	202	**18**	663	**36**	4012

22½° Sixteenth Bends

4	66	**10**	202	**16**	484	**24**	1372
6	105	**12**	265	**18**	574	**30**	2080
8	150	**14**	382	**20**	858	**36**	4012

Tees

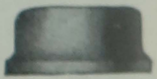
Size, In.	Wt., Lbs.	Size, In.	Wt., Lbs.	Size, In.	Wt., Lbs.
4x 4x 4	128	**10x10x 6**	352	**16x16x16**	969
6x 6x 6	200	**10x10x 4**	338	**16x16x12**	861
6x 6x 4	183	**12x12x12**	512	**20x20x20**	1438
8x 8x 8	294	**12x12x10**	491	**24x24x24**	2113
8x 8x 6	270	**12x12x 8**	474	**30x30x30**	3660
8x 8x 4	255	**12x12x 6**	458	**36x36x36**	5567
10x10x10	395	**12x12x 4**	445	**48x48x48**	....
10x10x 8	371	**14x14x14**	724	....	....

Crosses

Size, In.	Wt., Lbs.	Size, In.	Wt., Lbs.	Size, In.	Wt., Lbs.
4x 4x 4x 4	166	**10x10x 6x 6**	406	**16x16x16x16**	1259
6x 6x 6x 6	257	**10x10x 4x 4**	377	**18x18x18x18**	1454
6x 6x 4x 4	221	**12x12x12x12**	623	**20x20x20x20**	1828
8x 8x 8x 8	372	**12x12x10x10**	577	**24x24x24x24**	2694
8x 8x 6x 6	325	**12x12x 8x 8**	545	**30x30x30x30**	4609
8x 8x 4x 4	294	**12x12x 6x 6**	512	**36x36x36x36**	6857
10x10x10x10	493	**12x12x 4x 4**	486	**48x48x48x48**	....
10x10x 8x 8	443	**14x14x14x14**	963	....	....

Plug

Plugs and Caps



Cap

Size In.	Wt., Lbs. Plug	Wt., Lbs. Cap	Size In.	Wt., Lbs. Plug	Wt., Lbs. Cap	Size In.	Wt., Lbs. Plug	Wt., Lbs. Cap
4	8	26	**14**	65	149	**30**	723	704
6	14	40	**16**	96	198	**36**	1050	1084
8	24	59	**18**	121	242	**48**	2047	2341
10	38	81	**20**	156	308	**54**	2733	3009
12	50	104	**24**	472	442	**60**	3397	3687

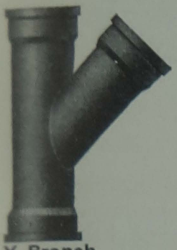
Sleeves

Size In.	Lgth. In.	Wt. Lbs.	Size In.	Lgth. In.	Wt. Lbs.	Size In.	Lgth. In.	Wt. Lbs.
4	15	61	**14**	18	280	**30**	24	1262
6	15	87	**16**	24	443	**36**	24	1772
8	15	119	**18**	24	518	**48**	24	2879
10	18	176	**20**	24	625	**54**	24	3571
12	18	223	**24**	24	821	**60**	24	4231

Specials for Cast Iron Pipe

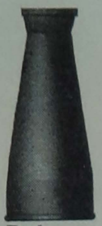
Class D

Y Branches

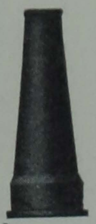


Y Branch

Size, In.	Wt., Lbs.
4x 4	103
6x 6	181
8x 8	291
10x10	434
12x12	632
14x14	985
16x16	1413
18x18	1737
20x20	2199
24x24	3599



Reducer



Increaser

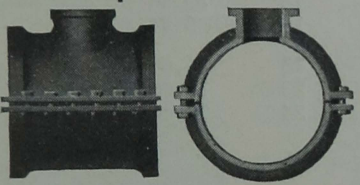
Reducers

Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt. Lbs.
6x 4	97	12x 6	202	16x10	364	20x12	576
8x 6	143	12x 4	179	18x16	569	24x20	987
8x 4	119	14x12	360	18x14	502	24x18	901
10x 8	198	14x10	320	18x12	446	24x16	838
10x 6	169	14x 8	288	18x10	405	24x14	764
10x 4	146	14x 6	256	20x18	776	30x24	1398
12x10	261	16x14	461	20x16	711	36x30	2264
12x 8	231	16x12	405	20x14	638	.....	....

Increasers

4x 6	104	6x 8	150	8x10	201	12x14	378
4x 8	132	6x10	180	8x12	240	.....	....
4x10	162	6x12	218	10x12	267	.....	....

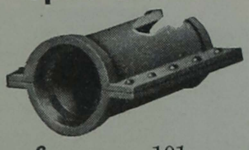
Split Tees



With any size outlet.

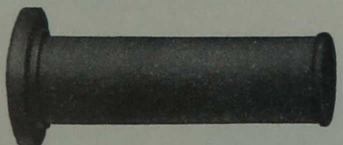
Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt. Lbs.
3	60	6	115	10	245
4	103	8	165	12	275

Split Sleeves



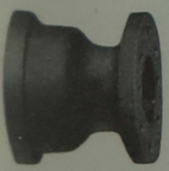
3	50	6	101	10	225
4	91	8	151	12	250

Flanges and Spigots



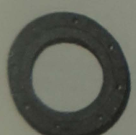
Size In.	Lgth. In.	Wt. Lbs.	Size In.	Lgth. In.	Wt. Lbs.	Size In.	Lgth. In.	Wt. Lbs.
3	16	24	10	18	140	18	20	340
4	16	38	12	18	173	20	20	425
6	16	60	14	18	220	24	24	635
8	16	90	16	20	255	..	..	...

Flanges and Bells

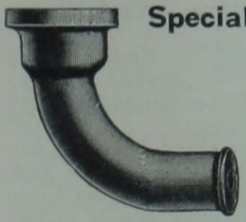


Size In.	Lgth. In.	Wt. Lbs.	Size In.	Lgth. In.	Wt. Lbs.
3	4	24	14	6	220
4	4	38	16	6	275
6	4	60	18	6	325
8	4	90	20	6	395
10	6	140	24	6	520
12	6	173	..	.	...

Flanges



Size In.	Wt. Lbs.	Size In.	Wt. Lbs.	Size In.	Wt. Lbs.
3	10	10	45	18	117
4	15	12	59	20	153
6	20	14	80	24	210
8	32	16	105	..	...



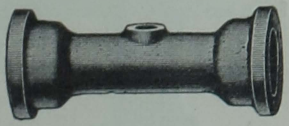
Specials for Cast Iron Pipe

*Tapped Elbows

Size Inches	Each	Size Inches	Each
3	.....	8	.....
4	.....	10	.....
6	.....	..	.....

*Made to order only.

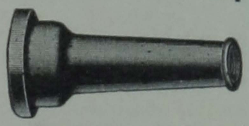
Tapped Tees



Size Inches	Each	Size Inches	Each
3	$13.75	6	$28.25
4	19.50	8	34.25

Tapped tees are made 12-inch laying length, unless otherwise ordered.

*Tapped Reducers

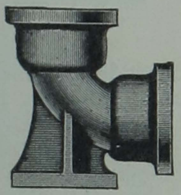


Size Inches	Each	Size Inches	Each
3	.....	8	.....
4	.....	10	.....
6	.....	..	.....

Fittings 6-inch and smaller tapped any size from ¾ to 2-inch; 8-inch and larger tapped any size from ¾ to 3-inch. In ordering, state size of tapping desired.

*Made to order only.

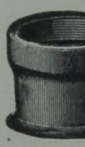
Base Elbows with Bell Ends



Size In.	Wt. Lbs.	Size In.	Wt., Lbs.	Size In.	Wt., Lbs.
3	91	6	180	10	354
4	119	8	276	12	457

Prices upon application.

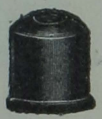
Tapped Couplings



Used to connect wrought iron with cast iron pipe of same size.

Size In.	Lgth. In.	Each	Size In.	Lgth. In.	Each
3	7¼	$7.25	8	9¼	$14.00
4	9¼	7.50	10	9¼	18.50
6	9¼	10.25	12	9¼	21.75

Tapped Plugs

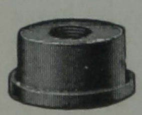


For connecting wrought iron pipe to larger cast iron pipe.

Size In.	Each	Size In.	Each	Size In.	Each
3	$5.50	6	$7.25	10	$12.00
4	6.00	8	10.25	12	13.50

Tapped 2 inches and smaller. Plugs tapped larger than 2 inches, add to above list prices as follows: 2½-inch, $1.00; 3-inch, $1.50; 4-inch, $2.00; 5-inch, $2.50; 6-inch, $3.00.

Tapped Caps



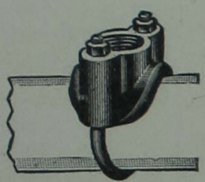
For connecting wrought iron pipe to larger cast iron pipe.

Size In.	Each	Size In.	Each	Size In.	Each
3	$7.50	6	$13.75	10	$18.75
4	10.50	8	15.00	12	24.75

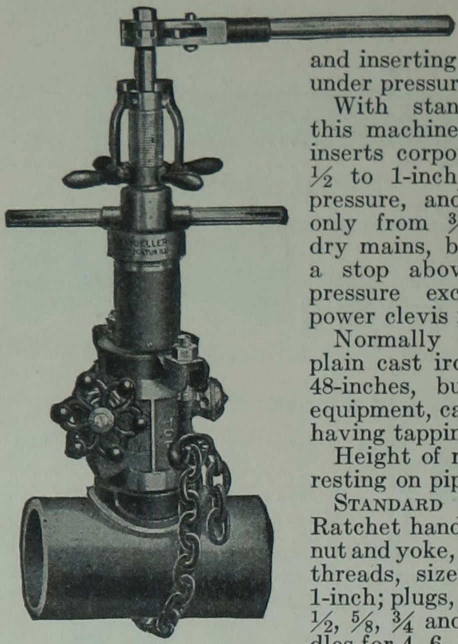
Tapped 2 inches and smaller. Plugs tapped larger than 2 inches, extra net as follows: 2½-inch, $1.00; 3-inch, $1.50; 4-inch, $2.00; 5-inch, $2.50; 6-inch, $3.00.

Saddles

For C.I. Pipe, In.	Tapped for Pipe, In.	Each
3	¾ to 2	$6.75
4	¾ to 2	9.50
6	¾ to 2	10.00
6	3	12.25
8	¾ to 2	15.25
8	3	15.25
10	¾ to 2	15.50
10	3	15.50
12	4 or less	18.25
14	4 or less	21.50



Type B Mueller Water Tapping Machines



For tapping water mains, and inserting corporation stops under pressure.

With standard equipment, this machine makes taps and inserts corporation stops from ½ to 1-inch in mains under pressure, and will make taps only from ⅜ to 2-inches in dry mains, but will not insert a stop above 1-inch. When pressure exceeds 90 pounds power clevis must be used.

Normally used for tapping plain cast iron pipe from 4 to 48-inches, but with suitable equipment, can tap smaller pipe having tapping bosses.

Height of machine with tool resting on pipe, 24¼ inches.

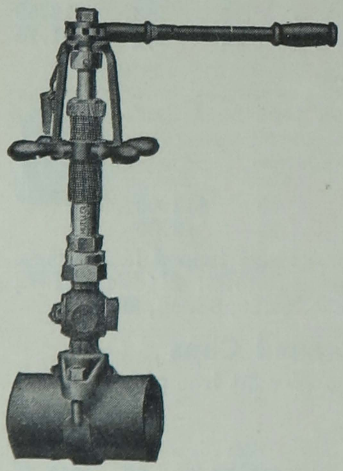
STANDARD EQUIPMENT.—Ratchet handle, combined feed nut and yoke, tools with Mueller threads, sizes, ½, ⅝, ¾ and 1-inch; plugs, male screw, sizes, ½, ⅝, ¾ and 1-inch; iron saddles for 4, 6, 8 and 10-inch cast iron pipe; rubber gasket for top of saddles; rubber gasket for all sizes of cast or wrought iron pipe; chain for pipe up to 12-inch; chain wrench and body cleaning chisel; oil and cutting grease.

Type B, in Strongly Constructed box.......each **$145.00**
Shipping weight..............................lbs. 120

Special iron-bound chest at an extra charge, if desired.

Optional equipment: Tools with I.P. Thread; 4 iron saddles for any size cast iron pipe; Inside, screw plugs with Mueller, Copper Pipe Connection, or I. P. Thread instead of Outside; without additional charge.

Type E Mueller Drilling Machines



The E drilling machine with suitable tools and adapter nipples, is made to drill holes from 7/16 to 1 inch inclusive.

This machine may be used on any size or kind of main, either dry or under pressure up to 100 pounds per square inch, but for pressure work a stop or valve is used between the machine and main.

The bronze body serves as a long bearing for the boring bar. It is provided with threads on its lower end for attaching to adapter nipples and a special packing on its upper end for pressure work.

The feed nut operates on a thread on the body, and may be connected to the boring bar by swinging the feed yoke over the friction collar. The entire mechanism lies below the ratchet handle, permitting a full swing when drilling.

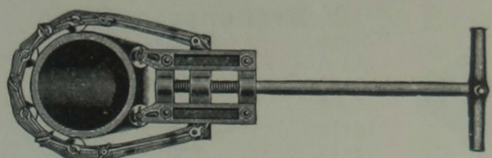
The regular tools and adapter nipples are designed for drilling through stops and service clamps, but short pattern tools may be used with regular nipples for drilling directly through a service clamp when not under pressure.

These combinations, as well as other sizes and styles of tools and nipples, may be used for any arrangement of stops, valves or fittings. Special types of nipples and other extra equipment can be supplied.

STANDARD EQUIPMENT.—Ratchet handle complete, boring bar complete, body complete, combined feed nut and yoke, lubricating oil and cutting grease.

Shipping Weight............................pounds 20
Type E....................................each **$25.00**

Cast Iron Pipe Cutters



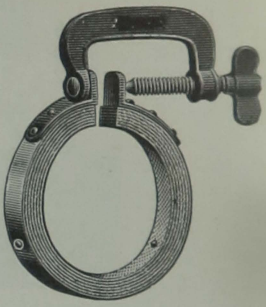
Every point in contact with the pipe is a cutting disc. The cutter when adjusted on the pipe need only be moved in a small part of a circle in order to cut entirely around the pipe.

		Price, Each					
No.	Cuts Cast Iron Pipe Inches	Cutters	Cutter Wheels	Short Curved Links	Long Links	Thumb Bolts and Nuts	Wheel Pins
01	4 to 8	**$50.00**	**$.60**	**$7.50**	**$6.00**	**$.45**	**$.20**
1	4 to 12	65.00	.60	7.50	6.00	.45	.20

No. T34 Pipe Jointers

These pipe jointers save time and trouble.

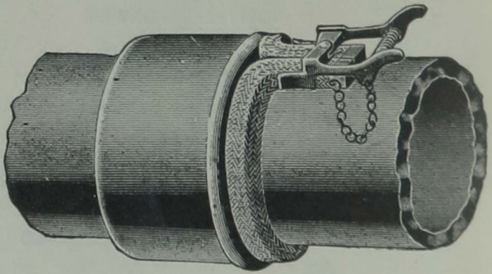
Size Pipe Inches	Price Each	Size Pipe Inches	Price Each
4	**$3.70**	14	**$8.60**
6	**4.70**	16	**9.35**
8	**5.70**	18	**10.00**
10	**6.90**	20	**10.60**
12	**7.70**	24	**12.80**



Sizes 30, 36, 42, 48, 60 and 72 inches made to order.

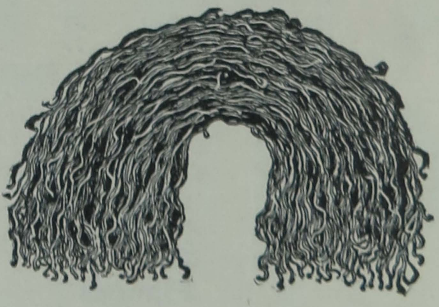
Asbestos Lead Joint Runner

This is a time saver and sure joint maker for plumbers, water and gas companies. Red-hot lead does not affect it. Made of solid asbestos.



No.	Square Inches	For Pipe Inches	Price Each
1, Improved	¾	2, 3 and 4	**$2.50**
2, Improved	¾	4, 5 and 6	**3.00**
3, Improved	1	6, 8 and 10	**4.50**
4, Improved	1	10, 12 and 14	**6.00**

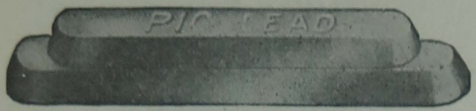
Lead Wool



Lead wool is lead cut in fine fibres which are put into the joint in the same way as yarn. The lead is being calked from the yarn up, which gives tight, perfect joint that will never leak and yet is flexible.

Per Pound...................................... .....

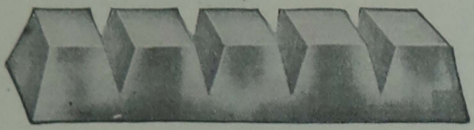
Pig Lead



Pigs weigh about 100 pounds.

Prices upon application.

Calking Lead



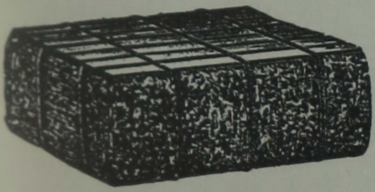
Furnished in 5-pound ingots.
Prices upon application.

Calking Irons

Made of the best tool steel and carefully hand-forged.

Size.............................inches	⅝x4½	⅝x7
Each..............................	$.40	.45

Oakum



Put up in 50-pound bales.

Best Spun.......
.......per bale .....

Best Unspun.....
.......per bale .....

Plumbers'.......
.......per bale .....

Rope Oakum

This is made entirely of jute, and comes in the form of a rope, about 1½ inches in diameter, wound in coils of about 50 pounds each. Untarred, it is used for caulking of water supply pipes. Tarred, it is used for all other kinds of pipe caulking.

Per Pound.........................

H & A Tarred Twisted Jute Packing

Made entirely of jute and is tarred. Used for caulking lead, soil and iron pipe. Packed in 50 and 100-pound coils and is about 1¼ inches in diameter, 8 threads.

Per Pound............ ....

H & A Untarred Twisted Jute Packing

Made of jute and is untarred, but slightly oiled. Used for caulking water supply pipes.

Approximately 1¼-inch diameter 8 threads. Supplied in 50 and 100-pound coils.

Per Pound........................ ....

H & A Unoiled (Dry) Twisted Jute Packing

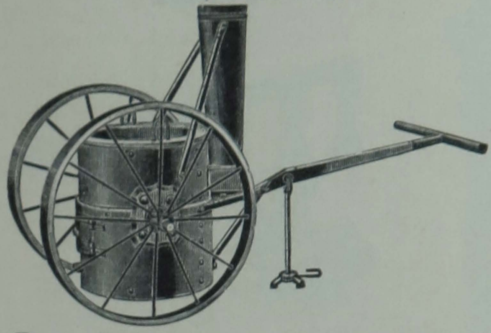
Made entirely of jute and is the same as untarred packing except that it is dry, having no oil whatever. Used in connection with substitutes for lead.

Approximately 1¼-inch diameter 8 threads.
Supplied in 50 and 100-pound coils.

Per Pound.................................. ....

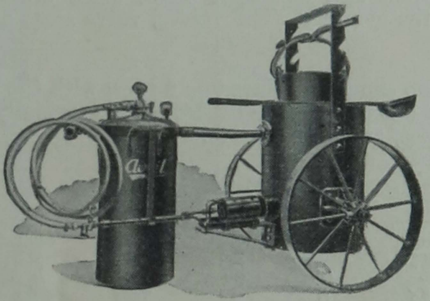
Lead Melting Furnaces

On Wheels, with Door



No.	Diam. In.	Ht. In.	Pot In. Diam.	Pot In. Depth	Capacity Lead, Lbs.	Ship. Wt. Lbs.	Price Each	Extra for Pot Rack
1	21½	24	16¾	11	700	530	$90.00	$10.00
2	16	24	11½	8	260	385	80.00	10.00

Aeroil Lead-Melting Furnaces



Portable

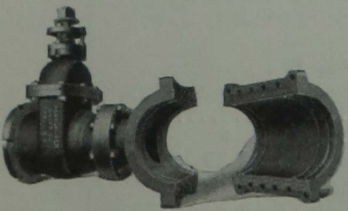
The portable type on wheels is the ideal melting furnace for pipe line laying or repair work. The burner may be detached from this furnace and used for many heating and thawing purposes. It is equipped with an improved type Aeroil Burner, which gives a quick, clean and economical heat.

Melts 200 to 850 pounds of lead in 8 to 35 minutes, respectively. Approximate oil consumption 1 to 2 gallons per hour.

Also made semi-portable, on legs, with same capacities.

Cap. Melt. Pot Lbs.	Cap. Oil Tank Gals.	Length Oil Hose Ft.	Portable			Semi-Portable		
			No.	Each	Ship. Wt. Lbs.	No.	Each	Ship. Wt. Lbs.
200	10	10	18W	$130.00	400	180	$110.00	350
450	10	10	24W	145.00	500	240	125.00	400
850	15	12	30W	160.00	600	300	140.00	500

Rensselaer Tapping Sleeves and Valves

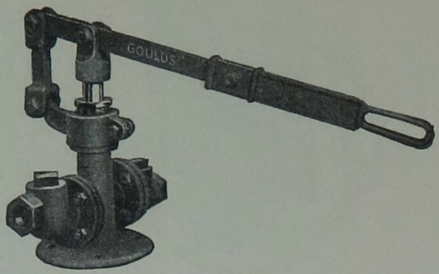


Rensselaer Tapping Sleeves and Crosses have a raised lead ring which is a part of the casting itself. Used for centering sleeve on pipe and also serves as a stop for jute packing against which lead is poured when caulking. Each size of sleeve and cross is designed suitable for the working pressure of the pipe to which it is to be attached.

Prices and information will be submitted on request.

Rensselaer Tapping Valves are class C iron body bronze mounted non-rising stem valve patterns and are tested to 300 pounds suitable for 150 pounds water working pressure. Made with ends suitable to fit any of the standard tapping sleeves and tapping machines.

No. 867 Goulds Hydraulic Pressure or Test Pumps



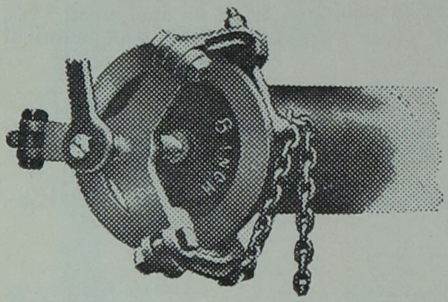
Compact in design. The top, secured with a set screw, can be turned so that the lever can be operated from any desired position.

The suction and discharge valve cases are flanged and bolted to the cylinder. The valves, valve seats and caps are brass.

The pump should be placed on a level with the water to be pumped or but little above it. Designed especially for testing boilers, pipes, casks, tanks, etc.

No.	Diam. Plunger In.	Stroke In.	Suction and Discharge Pipe In.	Working Pressure Lbs.	Approx. Wt. Lbs.	Each
0	¾	5	1	700	31	**$13.00**
1	1	5	1	550	32	**13.50**
2	1¼	5	1	400	36	**13.50**
3	1½	5	1	200	39	**15.00**

Ellis Pipe Clamps and Plugs



For use in testing, and in temporarily closing mains, or for any emergency where it is necessary to plug the pipe for a short time. Clamp can remain as long as desired.

Clamp is made of crucible steel and will easily hold a pressure of 200 pounds or more.

To place in position on pipe, insert the plug with gasket, then hold the main screw against plug while the chain is slipped around the pipe and locked into chain hook. A few turns on the chain hook nut brings the arms into position, a few turns by hand of the main screw sets the clamp ready to be tightened with the wrench, which is furnished. Large plugs are tapped with a ½-inch pipe plug. This is to allow escape of air, releasing water, or connecting gauge, etc.

All plugs to a set may not be needed; they are therefore quoted separately.

No. 1

No. 1 Clamp with Arms, Chain, Screw and Wrench ....per set **$45.00**

Size Plug....................	in.	**4**	**6**	**8**	**10**
Plug and Gasket...........	per set	**$2.25**	**3.50**	**5.00**	**7.75**

No. 2

No. 2 Clamp with Arms, Chain, Screw and Wrench ....per set **$75.00**

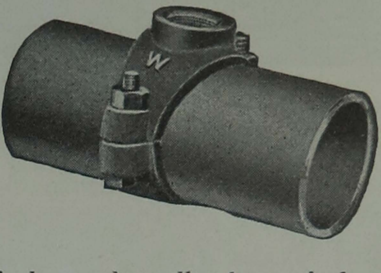
Size Plug........................	in.	**12**	**14**	**16**
Plug and Gasket.............	per set	**$11.50**	**13.00**	**20.00**

No. 3

No. 3 Clamp with Arms, Chain, Screw and Wrench ....per set **$85.00**

Size Plug........................	in.	**18**	**20**	**24**
Plug and Gasket.............	per set	**$25.00**	**30.00**	**35.00**

No. 7257 Walworth Malleable Water Pipe Clamps



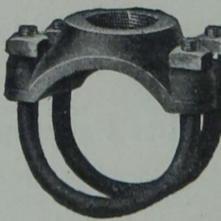
Clamps 3 inches and smaller have single wrought iron bands; 3½ inches and larger have malleable iron bands.

		Clamps Will Fit				
No.	Each	O.D. Circle In.	Size Wrought Pipe In.	O.D. Casing In.	Size Cast Iron Pipe In.	Size Pipe Connections Clamps Are Tapped for In.
0	**$1.00**	1⅞	1½	2	.	½, ¾
1	**1.00**	2⅜	2	2½	.	½ to 1
2	**1.25**	2⅞	2½	2¾, 3	2	1, 1¼
3	**1.25**	3½	3	3½	.	½ to 1
4	**1.50**	3½	3	3½	.	1¼ to 2
5	**1.50**	4	3½	4	3	¾, 1
6	**1.75**	4	3½	4	3	1¼ to 2
7	**1.75**	4½	4	4½	.	½ to 1½
8	**2.00**	4½	4	4½	.	2
9	**4.00**	4½	4	4½	.	2½, 3
10	**1.80**	5	4½	5	4	¾ to 1½
11	**2.15**	5	4½	5	4	2
12	**4.00**	5	4½	5	4	2½, 3
13	**1.80**	5½	5	5½	.	¾ to 1½
14	**2.15**	5½	5	5½	.	2
15	**4.00**	5½	5	5½	.	2½, 3
16	**2.00**	6	....	6	5	½ to 1½
17	**2.40**	6	....	6	5	2
18	**4.50**	6	....	6	5	2½, 3
19	**2.25**	6⅝	6	6⅝	.	¾ to 1½
20	**2.50**	6⅝	6	6⅝	.	2
21	**5.00**	6⅝	6	6⅝	.	2½, 3
22	**2.50**	7	....	7	6	¾ to 1½
23	**2.70**	7	....	7	6	2
24	**5.00**	7	....	7	6	2½, 3
25	**2.50**	7⅝	7	7⅝	.	¾ to 1½
26	**2.70**	7⅝	7	7⅝	.	2
27	**5.00**	7⅝	7	7⅝	.	2½, 3
28	**4.50**	8	....	8	7	¾ to 1½
29	**5.00**	8	....	8	7	2
30	**5.50**	8	....	8	7	2½, 3
30½	**5.50**	8⅝	8	8⅝	.	¾ to 1½
31	**5.50**	8⅝	8	8⅝	.	2 to 3
32	**6.00**	8⅝	8	8⅝	.	4
33	**8.00**	9⅝	9	....	.	1½ to 3
34	**9.00**	10	....	10	9	¾ to 2
35	**9.00**	10¾	10	....	.	¾ to 2
36	**10.00**	12¾	12	....	.	¾ to 2

Always order water pipe clamps by number.

Malleable Iron Pipe Saddles

Double Strap



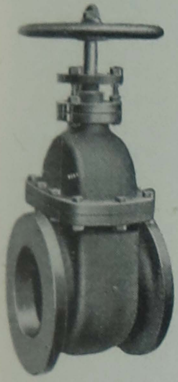
Size Pipe In.	Each	Tapped for Pipe In.
2	**$1.00**	½ to 1½
2½	**1.25**	¾ to 1½
3	**1.25**	¾ to 2
3½	**1.40**	¾ to 2
4	**1.50**	¾ to 2
4½	**2.50**	¾ to 2
5	**2.75**	¾ to 2
5	**2.75**	2½ and 3
6	**2.75**	¾ to 2
6	**5.75**	2½ to 4
7	**6.50**	1 to 4
8	**6.50**	1 to 4
10	**10.00**	1½ to 4
10	**10.00**	4½ to 6
12	**14.00**	1½ to 4
12	**14.00**	4½ to 6

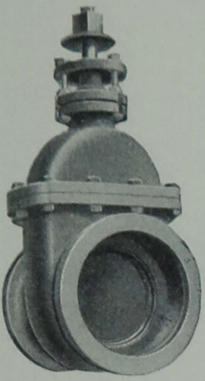
Rensselaer Water Works Gate Valves

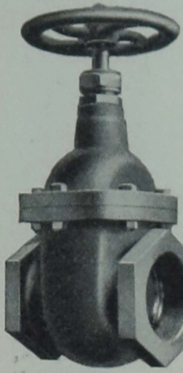
Bronze Mounted, Stationary Stem

Double Disc—Parallel Seat—Non-Rising Stem

In ordering specify whether nut or hand wheel operated and direction of opening wanted.


Flange Ends


Hub Ends


Screw Ends

Class C—Heavy Pressure

Water Working Pressure, 100 to 150 Lbs.—Test Pressure 300 Lbs.

Conforms to the American Water Works Association Specifications.

Size In.	Hub Type Each	Flange Type Each	Screw Type Each	Size In.	Hub Type Each	Flange Type Each	Screw Type Each
1¼	......	$10.75	$9.50	12	$126.00	$135.10	$128.00
1½	......	10.75	9.50	14	190.00	205.30	......
2	$15.50	16.60	*11.40	15	......	258.35	......
2½	......	17.00	16.00	16	240.00	258.35	......
3	18.35	20.40	19.00	18	345.00	363.35	......
3½	......	25.75	24.50	20	400.00	420.50	......
4	23.00	26.05	26.00	22	......	625.50	......
4½	.....	34.00	32.00	24	595.00	625.50	......
5	33.50	36.55	36.00	26	......	796.35	......
6	42.00	47.05	45.50	30	1200.00	1271.50	......
7	55.25	60.00	57.00	36	1800.00	1892.00	......
8	66.00	71.05	71.00	40	....	2801.50	......
9	.....	108.15	.....	42	2675.00	2801.50	......
10	100.00	108.15	103.00	48	3600.00	3777.50	......

*For valve with Handwheel. For valve with hub nut, $16.60.

Class B—Standard

Water Working Pressure, 50 to 100 Lbs.—Test Pressure, 200 Lbs.

Conforms to the American Water Works Association Specifications except for pressure ratings.

4	$13.05	$14.60	$14.60	18	$170.00	$183.75	......
5	18.85	19.70	19.70	20	201.55	215.90	......
6	23.55	24.70	24.70	22	297.00	318.30	......
8	34.95	37.55	37.55	24	297.00	318.30	......
10	47.90	53.25	50.90	28	589.60	611.60	......
12	61.05	68.15	65.35	30	589.60	611.60	......
14	111.50	118.65	.....	36	943.10	969.35	......
15	133.75	148.50	.....	42	1433.35	1464.00	......
16	133.75	148.50	.....	48	1961.35	2006.70	......

Class A—Light Pressure

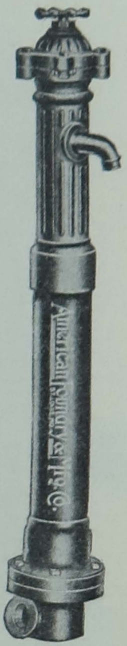
Water Working Pressure, 25 to 50 Lbs.—Test Pressure, 100 Lbs.

Conforms to the American Water Works Association Specifications except for pressure ratings.

5	......	$20.25	$20.25	20	$173.35	$184.80	......
6	$23.75	24.25	24.25	22	241.35	264.00	......
7	.....	30.95	30.95	24	241.35	264.00	......
8	34.75	37.00	37.00	26	404.30	436.45	......
9	47.15	51.25	49.00	28	517.15	540.60	......
10	47.15	51.25	49.00	30	517.15	540.60	......
12	63.25	70.80	65.30	32	......	647.45	......
14	98.15	105.60	.....	36	728.60	768.60	......
15	120.70	132.95	.....	40	......	984.30	......
16	120.70	132.95	.....	42	1131.45	1195.70	......
18	150.95	162.10	.....	48	1617.15	1657.85	......

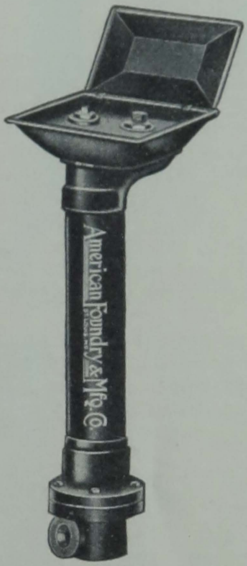
No. 140 National Compression Hydrants

Type A—Extra Large Pattern



Has anti-freezing automatic drain, full waterway, brass trim, and rubber valve.

Lgth. to Set in Ground Feet	Inlet and Outlet		
	1¼ In. Each	1½ In. Each	2 In. Each
1½	$20.00	$27.70	$37.50
2	20.50	28.00	38.00
2½	20.75	28.30	38.50
3	21.00	28.60	39.00
4	21.50	29.20	40.00
5	22.00	29.80	41.00
6	22.50	30.40	42.00
8	23.50	31.60	44.00
10	24.50	32.80	46.00


American Foundry & Mfg. Co.

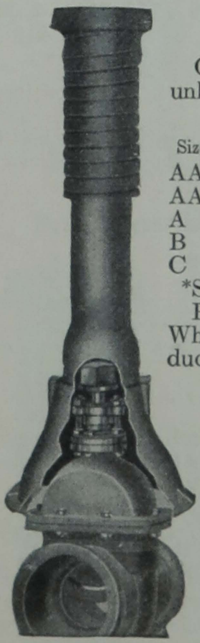
Nos. 140 and 145 regularly furnished with female I. P. thread inlet and hose thread outlet.

No. 145 National Street Washers

Type A—Extra Large Pattern

Lgth. to Set in Ground Feet	Inlet and Outlet		
	1¼ In. Each	1½ In. Each	2 In. Each
1½	$18.15	$24.85	$33.60
2	18.40	25.15	34.10
2½	18.65	25.45	34.60
3	18.90	25.75	35.10
4	19.40	26.35	36.10
5	19.90	26.95	37.10
6	20.40	27.55	38.10
8	21.40	28.75	40.10
10	22.40	29.95	42.10

Extension Valve Boxes and Parts



Valve Boxes with 5¼-Inch Shafts

For Gas and Water Mains

Covers marked "Water" will be furnished unless otherwise specified.

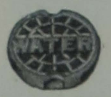
Size	Extension Length Inches	Price Each	Size	Extension Length Inches	Price Each
AAA	*17	$6.00	CC	48–60	$9.00
AA	22–28	7.25	D	42–66	9.45
A	28–40	7.55	E	48–72	10.20
B	36–48	8.20	F	60–84	10.95
C	42–54	8.55	G	72–96	11.90

*Stationary length.

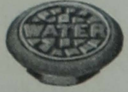
Prices are for boxes with No. 6 base. When furnished with other bases, add or deduct as follows:

Base No.	Shape of Base	Fits Valve Max. Size Inches	Add to Above Price	Deduct from Above Price
4	Round	4 or Smaller	....	....
†140	Dome	Up to 24	....	....
16	Round	12 or 16	3.50	...
160	Oval	16 or Smaller	.80	...
162	Oval	20 or Smaller	3.60	...

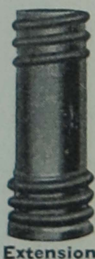
†Same as with No. 6.



Regular Cover



Flanged Cover


Extension Section

Covers for Valve Boxes

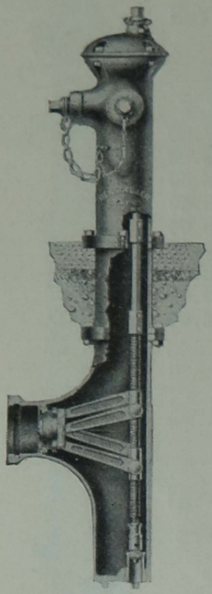
Price, Regular and Flanged........each ....
Price, Lock.......................each ....

Valve Box Extension Sections

For 5¼-Inch Boxes

Price, No. 58, Increasing Length, 14 Inches.....each $1.75

Rensselaer Genuine Corey Fire Hydrants



Conforms to standard specifications of American Water Works Association. Delivers to the hose a solid stream of water the full size of the valve opening.

Operated by the knuckle joint principle; can be operated with great ease and speed even under maximum working pressure owing to the great power which this principle gives just at the time of opening or closing.

All interior working parts can be removed for making repairs by simply taking out the hydrant head bolts, it being unnecessary to disturb the standpipe or barrel.

Made in 3 styles: Plain nozzle, inside independent gate type, and outside independent gate type. The plain nozzle and the inside independent nozzle styles are for use in public fire protection systems and mill yards. The outside bolted valve style is also for mill yard use. Independent styles are for use where it might be desirable to change hose or to attach more hose to a hydrant that is already in use without shutting off the water at the main. Steamer nozzles of either type can be furnished.

Furnished with or without the extra ground flange joint as shown in the illustration. In case of accident, the hydrant will break above this extra flange joint. Upper coupling permits repairs to operating rod without disturbing internal working parts. All replacements above pavement made without shutting off water in main.

Furnished for a working pressure of 150 pounds per square inch unless otherwise ordered. Tested to 300 pounds.

Size Hydrant	4	4½	5	6
Each	$80.00	95.00	100.00	110.00
Add or Deduct for Each 6 In. (or Fraction) in Length of Bury	1.16	1.45	1.74	2.03
Diam. of Valve Opening.in.	4	4½	5	6¼
Approx. I.D. Standpipe.in.	6	6½	7	8

Price is based on 5-foot bury with 1 or 2 hose nozzles, 4 or 6-inch hub inlet connection.

In ordering hydrants, specify size of operating nut, right or left hand opening, number of nozzles and type of thread.

Directions for Ordering Hydrants and Parts of Hydrants

When ordering hydrants give the following information:

1.—State figure number and size of valve opening.

2.—Specify length from surface of ground to bottom of connecting pipe.

3.—State size of connecting pipe and style of end desired. Regular hydrants have a hub end.

4.—Always state whether hydrants open by turning to the right, like the moving hands of a clock, or to the left, in the opposite direction.

5.—Mention number, size and style of nozzles.

6.—Give size and shape of operating nut. If using National Standard specify accordingly.

7.—Send male coupling or hydrant nozzle to show threads desired. If using National Standard, specify accordingly.

The use of National Standard Threads and Operating nuts is recommended.

When ordering parts of hydrants give the following information:

1.—Specify size of hydrant, which can be determined by the number of bolts in the head—4-inch having 4 bolts, 5-inch having 5 bolts, and 6-inch having 8 bolts.

2.—Specify date of original order or order number.

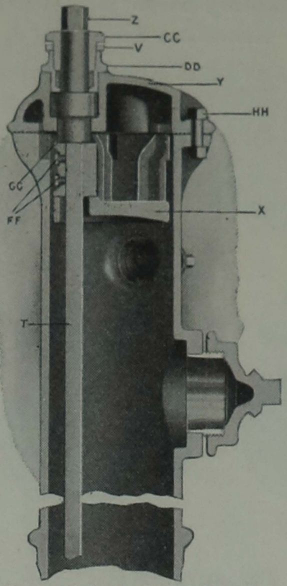
3.—Mention figure number of hydrant for which parts are wanted.

4.—Specify letter or double letter denoting part desired.

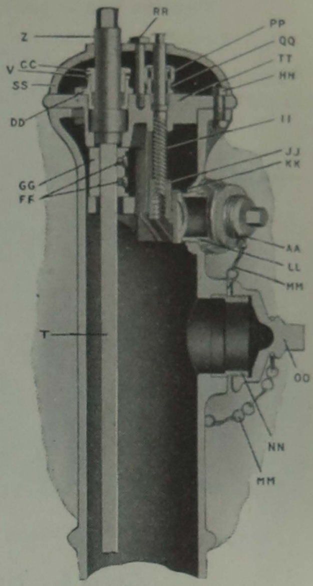
5.—State whether hydrant opens, right or left.

All hydrant parts are interchangeable.

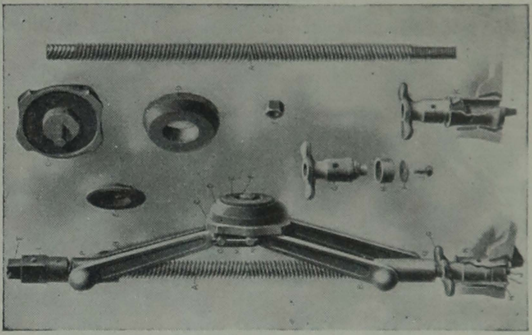
Hydrant Parts



5 and 6-Inch Plain Nozzle Hydrant



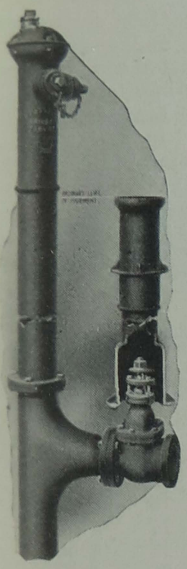
4, 5 and 6-Inch Inside Independent Nozzle Hydrant



Lower Working Parts of Corey Hydrants

A.—Rolled Tobin Bronze Threaded Spindle
B.—Operating Arms or Braces
C.—Main Hydrant Gate
D.—Main Rubber Valve
E.—Main Valve Washer
F.—Main Valve Bronze Nut
G.—Grass Drip Valve Holder
H.—Rubber, Cup Shaped Drip Valve
I.—Brass Drip Valve Washer
J.—Tobin Bronze Drip Valve Bolt
K.—Brass Drip Barrel
L.—Bronze Coupling or Connection, with Rivets
M.—Brass Cotter Pins
N.—Long Tobin Bronze Gate Pin
O.—Short Tobin Bronze Gate Pin
P.—Short or Top Bronze Stem Nut
Q.—Long or Bottom Bronze Stem Nut
R.—Brass Seat Ring
S.—Hydrant Bottom
T.—Operating Rod
U.—Hydrant Standpipe
W.—Brass Nozzle (Threaded)
X.—Deflector
Y.—Hydrant Head
Z.—Hydrant Sleeve with Operating Nut
AA.—Nozzle Cap
CC.—Brass Follower
DD.—Brass Stuffing-Box
EE.—Deflector Bolt
FF.—Sleeve Set Screw
GG.—Sleeve Collar for Operating Rod
HH.—Bolts for Head and Standpipe
II.—Bronze Independent Nozzle Stem
JJ.—Bronze Stem-Nut for Independent Stem
KK.—Bronze Gate for Independent Valve
LL.—Brass Nozzle for Independent Gate
MM.—Chain for Nozzle Caps
NN.—Brass Steamer Nozzle
OO.—Steamer Nozzle Cap
PP.—Bronze Cover Nut for Independent Stem
QQ.—Bronze Stuffing-Box and Follower for Independent Stem
RR.—Bolt to Secure Dome SS to Head TT
SS.—Dome
TT.—Head for Independent Gate
VV.—Bolts Between Standpipe and Bottom

Auxiliary Valves and Valve Boxes



Corey hydrant fitted with an auxiliary valve which has a flange on one end to bolt to the hydrant and hub on the other end suitable to connect to the spigot end of cast iron pipe.

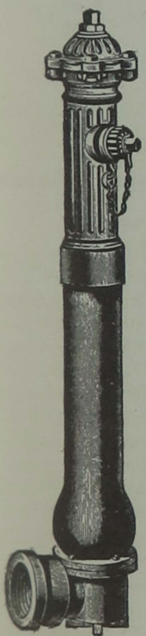
With this arrangement the water can be shut off when repairs are to be made to the hydrant without closing any of the gate valves in the distribution system.

Another arrangement is to use a short piece of pipe between the hydrant and the valve, in which case the inlet connection on the hydrant and the ends on the valve can be furnished as desired.

For prices on auxiliary valves refer to class C water works valves, flanged ends.

No. 71 National Type A Compression Fire Hydrants

Anti-Freezing



The No. 71 Hydrant is designed for private corporations where something smaller than the regular fire hydrant will suit. Made for wrought iron pipe inlet and iron pipe hose thread outlet unless otherwise ordered.

One washer only controls the entire valve for both seat and waste and is a double conical perforated washer, made of hard vulcanized rubber specially for this purpose.

When valve is open, this washer effectually closes the perforations in waste tube, and when valve is closed the compression of the rubber on the tapered seat, prevents water from escaping. All waste water is drained to prevent freezing.

This hydrant closes against the pressure and can be repaired without digging up.

Tested to 300 pounds pressure.

Operating wrench furnished with hydrant.

In ordering, give length to set in ground and size of inlet and outlet connections.

Lgth. in Ground Feet	1¼″ Inlet and Outlet 1¼″ Valve Opening Each	*1½″ Inlet and Outlet 1½″ Valve Opening Each	†2″ Inlet and Outlet 2″ Valve Opening Each
1½	$20.00	$27.70	$37.50
2	20.50	28.00	38.00
3	21.00	28.60	39.00
4	21.50	29.20	40.00
5	22.00	29.80	41.00
6	22.50	30.40	42.00

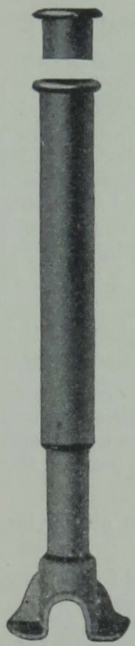
Approximate Weights

Size.....in.	1¼	1½	2
Lgth. in Ground, 5 Ft.....lbs.	45	60	100
Add or Deduct per Ft.....lbs.	4	5	10

*With 2-inch inlet, add $2.00; with two 1½-inch outlets, add $2.00. †With 2½ or 3-inch inlet, add $2.00; with two 2-inch outlets, add $4.00; with 2½-inch outlet, add $1.75.

It is impossible for us to feature all of our specialties. Advise us of your requirements and we will do the rest.

Service Boxes



Kansas City Pattern

Kansas City Pattern

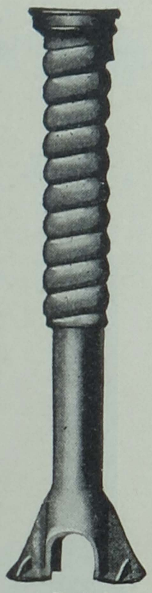
3-inch Shaft

Extension Inches	Price Each
40 to 60	....

Buffalo Pattern

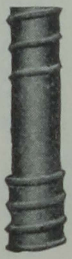
With 2½-inch Shaft

No.	Extension Inches	Price Each
88	12	$1.00
89-A	12 to 20	1.25
90-B	18 " 26	1.35
91-C	21 " 33	1.55
92-C	24 " 38	1.65
92-D	24 " 42	1.85
93-D	36 " 48	2.00
93-E	36 " 54	2.15
94-D	42 " 57	2.20
94-E	42 " 60	2.30
95-E	48 " 66	2.45
100-E	54 " 72	2.65
100-F	54 " 78	2.80
100FX	78 " 102	3.75
100FM	87 " 111	3.85



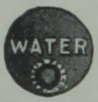
Buffalo Pattern

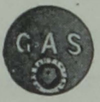
Extension Sections for 2½-inch Service Boxes

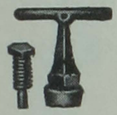


No.	Increases Length Inches	Price Each
151	9½	$.60
152	16½	.75
153	28	.95
154	33	1.05

Covers, Bolts and Keys

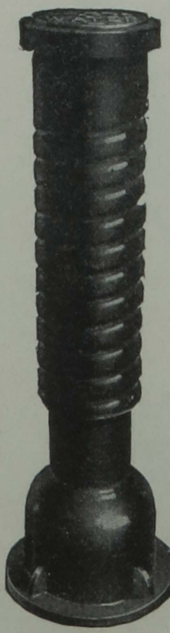






Price, Keys........................	each	$.10
" Extra Covers................	"	.20
" Brass Bolts..................	"	.15

Roadway Boxes



Round Head

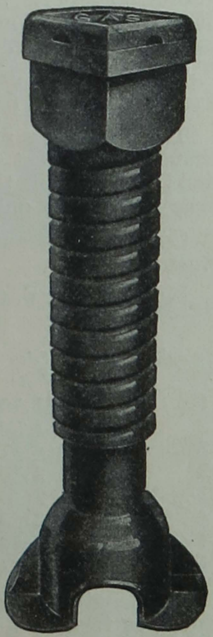
These roadway boxes have 4¼-inch shafts.

Round Head

No.	Each	Extension Inches
41Q	$4.15	18–24
42Q	5.15	27–34
42R	5.85	27–42
43R	6.15	34–48
44R	6.30	39–54
45R	6.70	46–60

Square Head

No.	Each	Extension Inches
137	$3.70	12
138	3.90	16
140U	4.10	18–24
141S	4.50	21–31
142S	4.75	25–35
142T	5.25	29–42
144T	5.90	41–54
145T	6.75	49–61

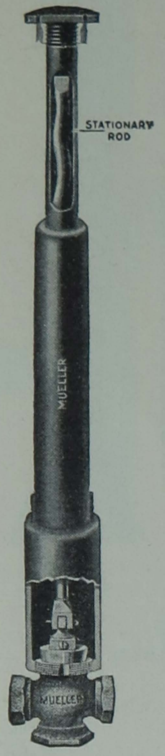


Square Head

Mueller Extension Service Boxes

With Stationary Rod, 1-inch Upper Section

Minneapolis Pattern



This Minneapolis Pattern Extension Service Box with stationary rod is made with 1-inch upper shaft only. This type of box has met the demands of waterworks superintendents in many localities. The stationary rod extending up into the upper section allows the use of a short key. This box is strong and light, meaning economy in freight rates and saving in breakage.

The base is tapped 1½ and 2 inches and this box may be used for curb stops in sizes ½ to 1-inch inclusive.

The stationary rod in the 1-inch shaft box has a wave formed just below the upper end to hold it central in the standpipe, making the entry of the key quick and sure.

Coated inside and out with an air drying enamel.

No. 10312 for water. No. 10313 for gas.

Length Feet	Approx. Weight Pounds	Price Each	Length Feet	Approx. Weight Pounds	Price Each
1½	9	$1.86	6	18	$3.30
2½	10	2.18	6½	19	3.46
3	11	2.34	7	20	3.62
3½	12	2.50	7½	21	3.78
4	14	2.66	8	22	3.94
4½	15	2.82	8½	23	4.10
5	16	2.98	9	24	4.26
5½	17	3.14	...	..	....

The lengths given above are the full extension. The 1½-foot box telescopes 6 inches; all other boxes telescope 1 foot.

Mueller Extension Service Boxes

With Stationary Rod, 1-inch Upper Section

Arch Pattern

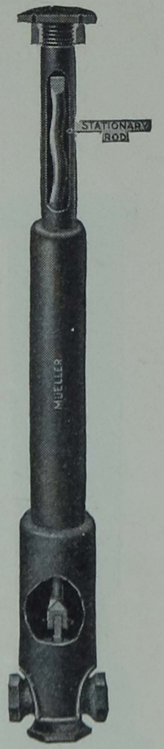
This Arch Pattern Extension Service Box with stationary rod is made with 1-inch upper shaft only. This type of box has met the demands of waterworks superintendents in many localities. The stationary rod extending up into the upper section allows the use of a short key. This box is strong and light, meaning economy in freight rates and saving in breakage.

This box is for use with curb stops in sizes from ½ to 1-inch inclusive.

The stationary rod in 1-inch shafts has a wave formed just below the upper end to hold it central in the standpipe, making the entry of the key quick and sure.

Coated inside and out with an air drying enamel.

No. 10314 for water. No. 10315 for gas.

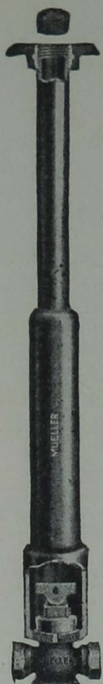


Length Feet	Approx. Weight Pounds	Price Each	Length Feet	Approx. Weight Pounds	Price Each
1½	9	$1.70	5½	17	$2.98
2	9½	1.86	6	18	3.14
2½	10	2.02	6½	19	3.30
3	11	2.18	7	20	3.46
3½	12	2.34	7½	21	3.62
4	14	2.50	8	22	3.78
4½	15	2.66	8½	23	3.94
5	16	2.82	9	24	4.10

The lengths given above are the full extension. The 1½-foot box telescopes 6 inches; all the other boxes telescope 1 foot.

Mueller Improved Extension Service Boxes

Minneapolis Pattern



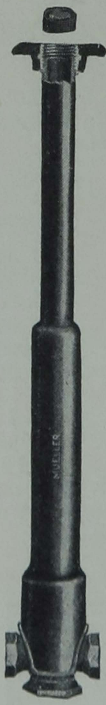
For use with Minneapolis Pattern curb stops. Made with 1¼, 1½ and 2-inch upper sections. Boxes with 1¼-inch upper section can be tapped 1½-inch for use with ¾ and 1-inch gas stops or ¾, ⅝ and 1-inch water stops or tapped 2-inch for use with 1½-inch gas stop or 1-inch water stop. Boxes with 1½-inch upper section is tapped 2½-inch for use with ¾, 1, 1¼ or 1½-inch gas stops or ½, ⅝, ¾, 1 or 1¼-inch water stops. Boxes with 2-inch upper section can be tapped 2½ for use with 1½-inch gas stop, 3-inch for use with 2-inch gas or 1½-inch water stop, or 3½-inch for use with 2-inch water stop.

	1¼-Inch No. 10300 Water No. 10301 Gas		1½-Inch No. 10302 Water No. 10303 Gas		2-Inch No. 10304 Water No. 10305 Gas	
Length Feet	Each	Av. Wt. Lbs.	Each	Av. Wt. Lbs.	Each	Av. Wt. Lbs.
2	$1.96	12	$2.64	13	$3.68	21
2½	2.10	14	2.82	15	4.00	23
3	2.24	15	3.00	16	4.34	25
3½	2.38	16	3.18	17	4.66	27
4	2.52	17	3.36	18	5.00	28
4½	2.66	18	3.54	20	5.32	30
5	2.80	19	3.72	21	5.66	32
5½	2.94	20	3.90	22	5.98	34
6	3.08	22	4.08	23	6.32	35
6½	3.22	23	4.26	25	6.64	37
7	3.36	24	4.44	26	6.98	39
7½	3.50	25	4.62	27	7.30	41
8	3.64	26	4.80	28	7.64	43
8½	3.78	27	4.98	30	7.96	44
9	3.92	28	5.16	31	8.30	46
9½	4.06	29	5.34	32	8.62	48
10	4.20	31	5.52	33	8.96	50

Lengths given above are the full extension. The 2-foot box telescopes 6 inches; all other boxes telescope 1 foot.

Mueller Improved Extension Service Boxes

Arch Pattern



These boxes may be used with any straight or round way curb stop. Boxes with 1¼ and 1½-inch upper sections may be used for stops from ½ to 1 inch inclusive. Boxes with 2-inch upper sections are intended for stops in sizes from 1¼ to 2 inches inclusive.

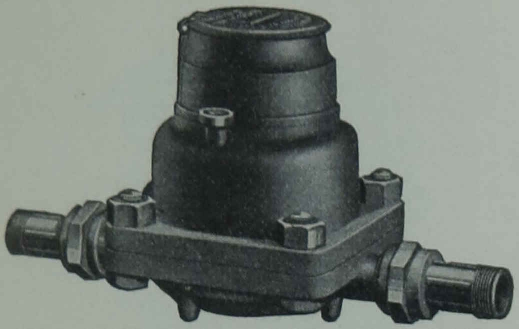
For stops in sizes from ½ to 1 inch the boxes with 1¼-inch upper section are recommended. They meet all conditions and are most economical. When larger stops are installed boxes with 2-inch upper section must be used.

Stops are furnished separately and are not included in price of boxes.

	1¼-Inch No. 10306 Water No. 10307 Gas		1½-Inch No. 10308 Water No. 10309 Gas		2-Inch No. 10310 Water No. 10311 Gas	
Length Feet	Each	Av. Wt. Lbs.	Each	Av. Wt. Lbs.	Each	Av. Wt. Lbs.
2	$1.80	12	$2.36	13	$3.52	21
2½	1.94	14	2.54	15	3.86	23
3	2.08	15	2.72	16	4.18	25
3½	2.22	16	2.90	17	4.52	26
4	2.36	17	3.08	18	4.84	28
4½	2.50	18	3.26	20	5.18	30
5	2.64	19	3.44	21	5.50	32
5½	2.78	20	3.62	22	5.84	34
6	2.92	22	3.80	23	6.16	35
6½	3.06	23	3.98	25	6.50	37
7	3.20	24	4.16	26	6.82	39
7½	3.34	25	4.34	27	7.16	41
8	3.48	26	4.52	28	7.48	43
8½	3.62	27	4.70	30	7.82	44
9	3.76	28	4.88	31	8.14	46
9½	3.90	29	5.06	32	8.48	48
10	4.04	31	5.24	33	8.80	50

Lengths given above are full extension. The 2-foot box telescopes 6 inches; all other boxes telescope 1 foot.

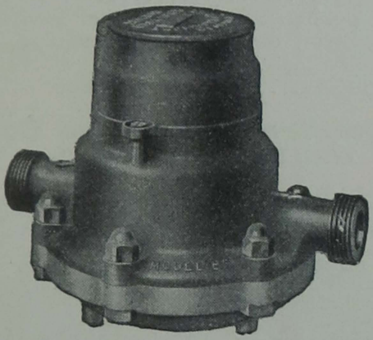
Niagara and American Water Meters



Niagara Solid Casing Type Meter, ⅝-Inch Size

The Niagara Solid Casing Type Meter has an outside casing of cast iron carefully hot zinc coated. Especially recommended for heavy pressure, hard water, alkaline water and corrosive water.

The American Solid Casing Type Meter has an outside casing made entirely of bronze. Regularly furnished with external threads for brass union meter couplings. 1¼, 1½ and 2-inch sizes may also be furnished with internal pipe threads without extra charge.



American Frost Bottom Type Meter, ⅝-Inch Size

The Niagara Frost Bottom Type Meter has its outside casing made of cast iron hot zinc coated. When this meter freezes up and the ice pressure reaches 500 pounds per square inch the frost bottom bursts. This releases the intermediate gearing and the disc chamber so their parts may separate and move with the ice, thereby relieving each part from injurious strain. A new ⅝-inch frost bottom costs 40 cents.

The American Frost Bottom Type Meter has the main casing of bronze with frost bottom of galvanized cast iron. Breaking action is the same as in the Niagara meter described above. This type is now the most widely used by water works.

Gear trains are patented chromium-shell water-lubricated type. Oil-enclosed type $1.00 list extra in sizes up to 2 inches. All meters comply with the standard specifications of the American Water Works Association covering accuracy, capacity, interior construction and dimensions.

		Niagara		American		
Size Inches	Greatest Proper Capacity U.S. Gal. per Min.	Either Type Each	Couplings Extra per Pair	Solid Casing Type Each	Frost Bottom Type Each	Couplings Extra per Pair
⅝x½	20	**$16.00**	**$1.00**	**$20.00**	**$18.00**	**$1.00**
⅝x¾	20	**16.00**	**1.50**	**20.00**	**18.00**	**1.50**
¾	34	**24.00**	**1.50**	**30.00**	**27.00**	**1.50**
1	53	**35.20**	**2.20**	**44.00**	**39.60**	**2.20**
1¼	75	***48.00**	**3.00**	**60.00**	.....	No Charge
1½	100	***64.00**	**4.00**	**80.00**	.....	" "
2	160	***96.00**	**6.00**	**120.00**	.....	" "
2½	240	***140.00**	**8.75**	**175.00**	.....	" "
3	315	***200.00**	No	**240.00**	.....	No
† 3	375	***240.00**	Charge	......	.....	Charge
† 4	500	***360.00**	for	**400.00**	.....	for
† 6	1000	***720.00**	Flanges	**800.00**	.....	Flanges

†Heavy duty type.
*Made in solid casing type only.

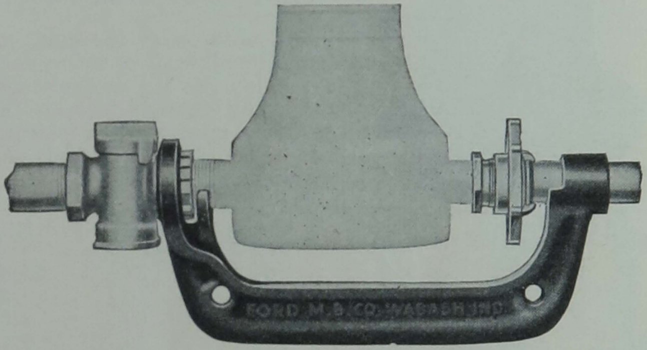
Ford Meter Yokes

The Ford Yoke is a device or special pipe fitting for connecting a water meter in a service line. It consists of 2 principal parts—a connecting or yoke piece which connects rigidly and permanently the inlet and outlet pipes, and an expansion connection which is screwed onto the meter and may then be expanded to set the meter or contracted to remove it.

Designed to provide maximum convenience and freedom from trouble in setting and removing the meter and in connecting the yoke in the service. The installation or removal of the meter requires only the turning of the handwheel of the expansion connection which does not disturb the piping. The inlet and outlet pipes remain connected and in line even when the meter is removed.

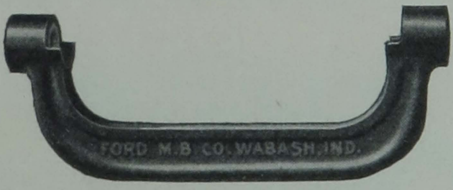
For ⅝, ⅝x¾, ¾ and 1 inch meter.

No. 110



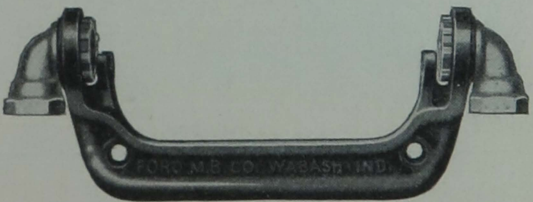
Straight line valve yoke, with inverted ground key roundway valve at inlet, outlet cast integral.
No. **110**....................................each **$3.00**

No. 102



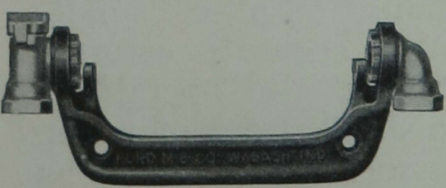
Straight line yoke without union, for new services.
No. **102**....................................each **$1.55**

No. 502



Riser yoke with plain bronze ell at each end.
No. **502**....................................each **$2.35**

No. 510



Inverted ground key angle valve at inlet, plain bronze ell at outlet.
No. **510**....................................each **$3.35**

Type C Ford Meter Box Covers

Single Lid

4 Inches Deep

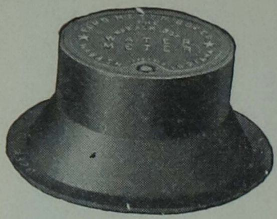
FORD METER BOX CO.
TYPE-C-BOX
WATER
METER
WABASH, INDIANA

No.	For Barrel I. D. In.	Lid Opening In.	Price Each
1	15	8	$2.40
2	18	9½	3.00
3	20	11½	3.70
12	18	8	3.10
31	15	11½	2.75
32	18	11½	3.20
313	13	11½	2.40

Special Covers
6 Inches Deep

No.	For Barrel I. D. In.	Lid Opening In.	Price Each
13	20	8	$3.60
33	20	11½	4.25

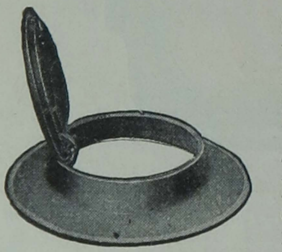
Wabash Meter Box Covers



Has double cover for cold climates. Fitted with a worm lock which holds the lid securely and when the key is turned to open, the lid is forced upward. The lock has bronze bolt and washers and cannot corrode.

No.	For Barrel Internal Diam. In.	Depth Inches	Lid Opening Inches	Approx. Shpg. Wt. Pounds	Price Each
1	15	9½	8	37	$4.00
2	18	9½	9½	45	5.00
3	20	9½	11½	60	6.50
31	15	9½	11½	49	5.65
32	18	9½	11½	53	6.00
Extra Heavy—To Withstand Street Traffic					
2H	18	9½	9½	80	$7.70
3H	20	9½	11½	103	9.50

Ford Type X Meter Box Covers



The Type X Cover was designed for the meter reader. To the man who opens hundreds of meter boxes in a day, the convenience in opening and closing them is of practical importance.

In reading a water meter under a Type X cover, the lid is simply leaned back instead of being lifted off and laid to one side. After the meter is read the lid is laid down and locked instead of being picked up, fitted into place and locked. The lid is kept cleaner because it is not laid down in the mud, snow or leaves.

Lid opening, 11½ inches; depth, 4 inches.

No.		31	32	3
Each		$2.75	3.20	3.70
Fits Tile, I.D.	inches	15	18	20

Water Supply Systems

Consult us on water supply systems, large or small. We furnish accurate estimates for installing and operation. We furnish all styles of pumps and accessories including deep well turbines.

Manhole Rings and Covers

Denver Pattern

MACLEAR FDY
DENVER
M

Diameter of Cover	in.	24	30
Each		$13.00	17.00
Diameter of Opening	in.	22½	28½
Diameter of Ring at Bottom	in.	31	37
Height Over All	in.	9	9
Approx. Weight	lbs.	350	525

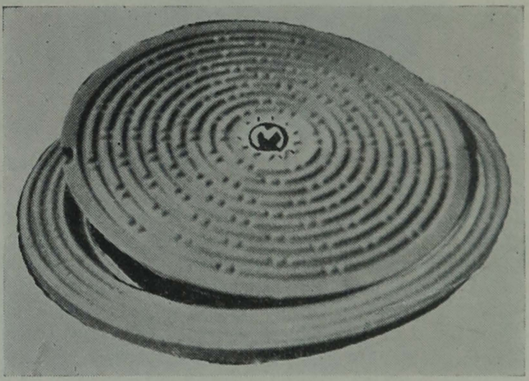
Perforated covers can be furnished if desired.

Colorado Springs Pattern

Diameter of Cover	in.	25
Each		$12.50
Diameter of Opening	in.	23
Diameter of Ring at Bottom	in.	30½
Height Over All	in.	6
Approx. Weight	lbs.	240

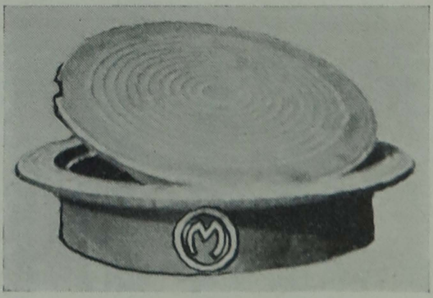
Storm Sewer Rings and Covers

With Hood and Hinge Plate



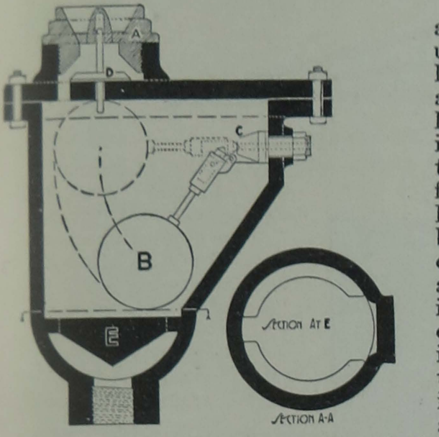
Diameter of Cover	in.	25¼
Complete	each	$17.00
Diameter of Opening	in.	24
Diameter of Ring at Top	in.	31½
Height Over All	in.	2
Approx. Weight	lbs.	285

Coal-Hole Rings and Covers



Diameter of Cover	in.	18	19¾	23¼
Each		$5.60	6.60	7.20
Diameter of Opening	in.	17½	19¼	22¼
Diameter of Ring at Top	in.	23	24	27¼
Height Over All	in.	4½	4¼	4
Approx. Weight	lbs.	70	85	105

McCracken Combined Air Relief and Vacuum Valves



The object of the air relief and vacuum valve on a pipe line is to release the air which accumulates at high points in the line and also to protect the pipe from possible collapse in case of a break or the sudden opening of valves along the line, allowing the water to be drawn off more rapidly than supplied at the intake, and causing the formation of a vacuum, tending to collapse the pipe, on account of the excessive external pressure.

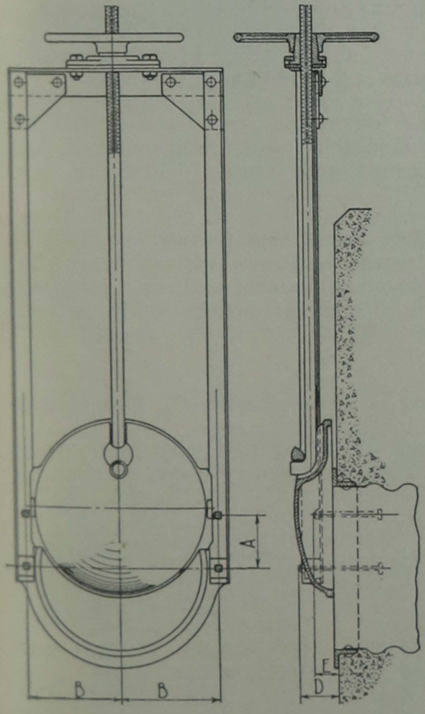
The McCracken Valve doubly safeguards any line on which it is installed. It permits the operation of the pipe line at its greatest capacity at all times, because of the complete removal of air from the line.

On account of the baffle provided, it cannot allow the valve to blow closed until the water enters.

Packed in boxes for shipping.

Size In.	Each	Height In.	Thickness In.	Width In.	Weight Each Lbs.	Shipping Weight Lbs.
½	**$34.00**	9	5¼	7⅝	17	21
¾	**37.00**	9½	5¾	8	17	21
1	**40.00**	10¾	6	8½	24	29
1½	**46.00**	12¼	6¾	10	36	42
2	**50.00**	14	7½	10¾	46	54
2½	**70.00**	15	9	12	66	75
3	**78.00**	15½	9½	12½	70	80

Model 100 Hardesty Canal and Low Pressure Reservoir Gates



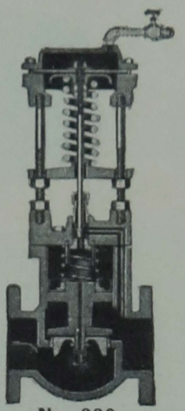
A light weight cast iron gate suitable for canal turnouts, small reservoirs, and other installations requiring a water tight face pressure gate for water depths of 20 feet or less.

The cast iron seat is made with a collar on the back which projects a sufficient distance to allow pipe to be attached when desired. This collar is a part of the gate seat casting and cannot be detached to provide a flat surface for bolting the gate to a head wall already in place.

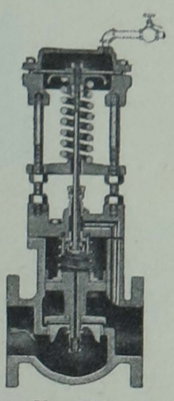
When used with a concrete wall, the seat and pipe must be in place when the wall is poured.

Diam. of Gate.....in.	**6**	**8**	**10**	**12**	**15**	**18**
A..................in.	3	3	4	4	5	6½
B..................in.	4	5	6⁵⁄₃₂	7³⁄₁₆	9¹⁄₁₆	10⁹⁄₁₆
D..................in.	3¼	3¼	3¾	3⅝	4	4
E..................in.	2	2	2¼	2¼	2¼	2⅜
Anchor Bolt.......in.	½	½	½	½	½	½

Kieley Altitude and Altitude Relief Valves



No. 220



No. 222

Used extensively for controlling water level in high tanks or towers. Piston controlled and so designed as to prevent water shock due to changes in flow. Suitable for hot or cold water. Where water is higher than 212° F., a special ring packing is used instead of leather cup.

Made in sizes 2 to 14-inch. Bodies cast iron; bronze parts.

In ordering, the following information should be given: Service for which valve is to be used; water pressure on discharge to pump; distance from pump discharge to water line in tank; number of valve; whether screwed or flanged; sketch, if possible, showing installation.

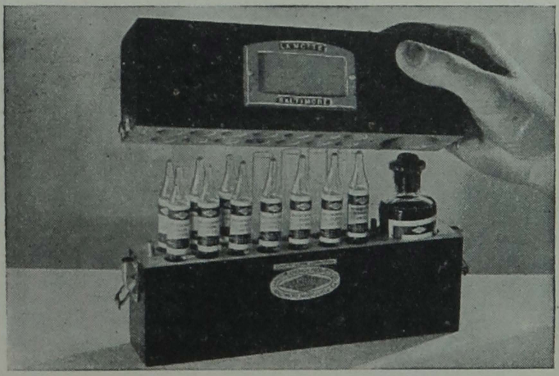
All flanged valves are drilled standard unless otherwise ordered. Companion flanges are extra and furnished only when ordered.

No. 220 Altitude Valve—No. 222 Altitude Relief Valve

Size In.	Screwed or Flanged Each	Screwed		Flanged	
		Face to Face, In.	Wt. Lbs.	Face to Face, In.	Wt. Lbs.
2	**$100.00**	6¾	55	7½	70
2½	**150.00**	7½	65	7¾	75
3	**200.00**	10¼	90	10	98
4	**280.00**	10½	110	10¾	125
5	**375.00**	13	160	12⅝	170
6	**470.00**	15¾	195	15	205
8	**625.00**	....	...	17½	275
10	**900.00**	....	...	21	375

Larger sizes on application.

LaMotte Block Comparator Outfits



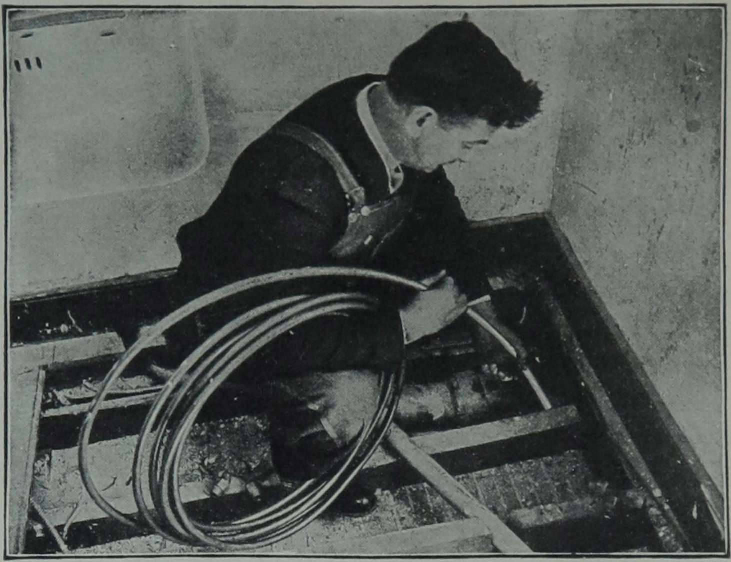
This compact outfit greatly facilitates simple, accurate hydrogen ion control. Especially recommended for use of individual operators on any step of a process where a definite pH value must be maintained.

Complete with any one set of LaMotte Permanent Color Standards, together with a supply of the corresponding indicator solution and marked test tubes. Even with highly colored or turbid solutions determinations can easily be made with accuracy.

Name	pH Range	Name	pH Range
Acid Cresol Red	0.2—1.8	Phenol Red	6.8— 8.4
Meta Cresol Purple	1.2—2.8	Cresol Red	7.2— 8.8
LaMotte Yellow	2.6—4.2	Thymol Blue	8.0— 9.6
Bromphenol Blue	3.0—4.6	LaMotte Oleo Red B	8.6—10.2
Bromcresol Green	3.8—5.4	LaMotte Purple	9.6—11.2
Methyl Red	4.4—6.0	LaMotte Sulfo Orange	11.0—12.6
Bromcresol Purple	5.2—6.8	LaMotte Violet	12.0—13.6
Chlorphenol Red	5.2—6.8		
Bromthymol Blue	6.0—7.6		

Complete.....................................each **$12.50**

Chase Copper Water Tube



Snaking Chase Flexible Copper Tube through the Floor

Chase Copper Water Tube is made from copper 99.9% pure. It will stand any city water pressure many times over. Made in 3 types, K, L and M and in 2 tempers, hard and soft.

Type K is furnished in both hard and soft tempers and is used for underground services and for general plumbing purposes with severe conditions. Soft temper is regularly made in sizes ⅜ to 2 inches, inclusive, in 20-foot straight lengths and in sizes ⅜ to 1¼ inches, inclusive, in 30, 45 and 60-foot coils. Hard temper is regularly made in sizes ⅜ to 8 inches, inclusive in 20-foot straight lengths.

Type L is also made in hard and soft temper and is used for general plumbing purposes. Hard temper is regularly furnished in sizes ⅜ to 8 inches, inclusive, in 20-foot straight lengths. Soft temper is regularly furnished in sizes ⅜ to 1 inch, inclusive, in 30, 45 and 60-foot coils, and in sizes ⅜ to 8 inches, inclusive, in 20-foot straight lengths.

Type M is furnished in hard temper only and is used for general plumbing and heating purposes with sweat fittings only, and with normal water conditions. Regularly furnished in sizes ⅜ to 8 inches, inclusive, in 20-foot straight lengths.

Type K soft temper tube should be used for all underground water service lines. The greatest economies can be affected through its use in long coils from the city water main to the curb, which usually is in one continuous length. From the curb stop to the house, again soft tubing is valuable, because it will curve around tree roots, rocks and cement foundations without joints, eliminating the expense of fittings.

Type L soft temper tube should be used for all in-the-wall replacements and repairs and in repiping old houses.

Both types of soft copper water tube are used with flared fittings.

Hard temper tube should be used for new installations and for straight cellar runs in all cases. Ideal for the moderately priced house.

Snaking Chase Flexible Copper Tube through the Floor

After a small passageway has been opened through fire stops on the lower floors one continuous length of flexible copper water tube can be snaked from the top floor to the cellar.

Water Tube Fittings

Chase Flared Fittings are for use with soft temper copper water tube. They are made from a special brass alloy with a high copper content which makes them as highly resistant to corrosion as Chase Copper Water Tube. They are much the same type of fittings used in automobiles, gasoline and oil lines. Each fitting is stamped with the Chase trademark.

Chase Sweat Fittings are to be used with hard temper copper water tube. They are clearly stamped with the Chase trademark.

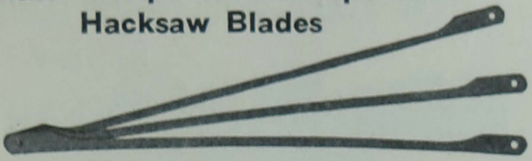
Standard Sizes and Weights

		Type K		*Type L		Type M	
Nominal Size Inches	O.D. Inches	Thickness Wall Inches	Weight Pounds per Foot	Thickness Wall Inches	Weight Pounds per Foot	Thickness Wall Inches	Weight Pounds per Foot
⅜	.500	.049	.269	.035	.198	.025	.144
½	.625	.049	.344	.040	.285	.028	.203
⅝	.750	.049	.418	.042	.362	....	....
¾	.875	.065	.641	.045	.455	.032	.328
1	1.125	.065	.839	.050	.655	.035	.464
1¼	1.375	.065	1.040	.055	.884	.042	.681
1½	1.625	.072	1.360	.060	1.140	.049	.940
2	2.125	.083	2.06	.070	1.75	.058	1.46
2½	2.625	.095	2.92	.080	2.48	.065	2.03
3	3.125	.109	4.00	.090	3.33	.072	2.68
3½	3.625	.120	5.12	.100	4.29	.083	3.58
4	4.125	.134	6.51	.110	5.38	.095	4.66
5	5.125	.160	9.67	.125	7.61	.109	6.66
6	6.125	.192	13.87	.140	10.20	.122	8.91
*8	8.125	.271	25.90	.200	19.29	.170	16.46
.	.....	....	.....	....	.....	....	.....
.	.....	....	.....	....	.....	....	.....
.	.....	....	.....	....	.....	....	.....

*Present government specifications do not include sizes larger than 6 inches nor the Type L in soft temper.

Chase Templates and Special Hacksaw Blades

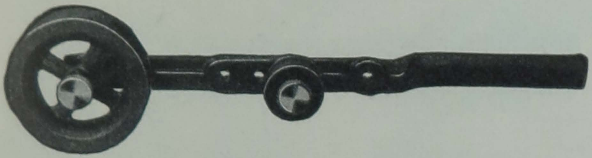
Template


Special Hacksaw Blades

For use in cutting opening in tube for tee.

3/8-Inch Template	each	$.25,	Plus 3 Blades	$.73
1/2-Inch Template	each	.30,	Plus 3 Blades	.78
5/8-Inch Template	each	.32,	Plus 3 Blades	.80
3/4-Inch Template	each	.35,	Plus 3 Blades	.83
1 -Inch Template	each	.40,	Plus 3 Blades	.88
1 1/4-Inch Template	each	.60,	Plus 3 Blades	1.08
1 1/2-Inch Template	each	.70,	Plus 3 Blades	1.18
2 -Inch Template	each	.95,	Plus 3 Blades	1.43
Special Hacksaw Blades Only			each	.20
Special Hacksaw Blades Only			per dozen	1.90

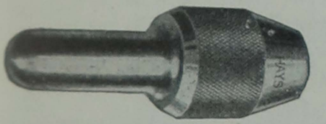
No. 1020 Chase Bending Tools for Copper Tubing



This bending tool is designed to make smooth return bends, perfectly aligned reverse bends, and accurate offsets in the smaller sizes of soft copper tubing. It consists of a lever bar or handle, 4 large grooved forming wheels and 2 small fulcrum wheels. These combinations of wheels are intended for bending 3/8, 1/2, 3/4 and 1-inch tubing. Correct position for each size of tubing is stamped on the handle. Not designed for heavy bending, and should never be forced with pry-bars.

No. **1020** Complete....................each **$4.85**

No. 128C Hays Flanging Tools



This tool can make a 100 per cent joint by driving the tool into the end of the service pipe.

Right angle flanging is secured with tool which has a predetermined and fixed radius that will roll copper service pipe to right angle flange and stop at right diameter of flat so that it will be a proper size to be engaged in nut.

Besides the flanging tool, a hack saw, knife or reamer and hammer are all the tools required for making joints.

Pipe should be cut square and resulting burrs reamed out, and coupling nut placed on the copper service pipe before inserting flanging tool. Insert flanging tool in pipe and strike with hammer, turning the tool slightly after each blow. Repeat blows until flange is made.

Size......in.	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Each........	$1.10	1.10	1.30	1.75	3.50	4.80	5.75

Chase Sizing Tools

No. 480, for types L and M copper water tube; hard and soft temper, general purpose. No. 481, for type K copper water tube; hard and soft temper underground service.

Size Inches	Each	Size Inches	Each	Size Inches	Each
3/8	$.65	3/4	$.95	1 1/2	$2.70
1/2	.80	1	1.10	2	3.60
5/8	.90	1 1/4	2.15	...	....

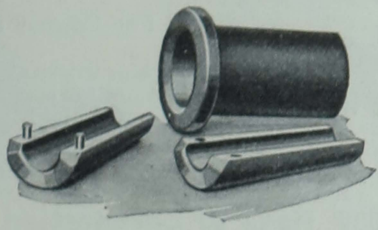
No. 128C-R Hays Flanging Tools

For Copper Service

Designed to make the 45° flare on copper service pipe for use with radius seal connections. Bevel on tool also acts as a stepping point for mechanic.

Size..............in.	1/2	3/4	1	1 1/4	1 1/2	2
No. 128C-R.....each	$1.10	1.30	1.75	3.50	4.80	5.75

No. 591 Hays Copper Service Pipe Holders



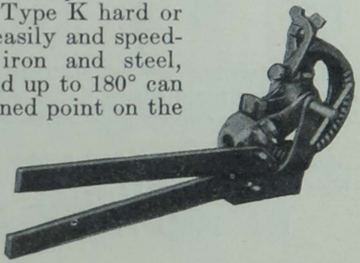
Designed to hold 1/2, 3/4 and 1-inch copper service pipe. Each size pipe requires a separate pair of jaws. The 1/2 and 3/4-inch jaws will fit into the same sleeve. Jaws for the 1-inch service pipe require a separate sleeve. Standard equipment holder consists of one sleeve and a pair of jaws. When ordering specify size of jaws required.

No. **591**, with one set of jaws		**$3.25**
Extra Jaws	per set	**2.10**

No. 590 Hays Bronze Hammers

Weight	pounds	2	3
No. **590**	each	$1.20	1.55

Hays Copper Pipe Benders



Designed to bend Govt. Type K hard or soft tempered copper pipe easily and speedily. Made of malleable iron and steel, machined in jigs. Any bend up to 180° can be made at any predetermined point on the copper pipe. Each ratchet move bends the pipe a fixed number of degrees. A machine marked 5° will require 18 notch movements to make a 90° bend.

Size....................in.	3/8	1/2	3/4	1
Each	$8.75	10.00	12.50	17.00
Degrees per Notch	7	6	6	5
Radius of Bend..........in.	1 1/2	2 1/4	3	4
Shortest Bend, End to Center..........in.	2 7/16	3 5/8	4 3/8	5 5/8
Weight..................lbs.	3 1/4	6	9 1/4	14 1/2

No. 100 Beaver Tubing Cutters

1/8 to 3/4-Inch

This is a handy little wheel cutter for copper tubing, 1/8 to 3/4-inch sizes. Produces clean square ends, without crushing. A precision-made tool of convenient design.

Length, 6 inches. Weight, 9 ounces.

Complete	each	**$2.00**
Extra Wheels	each	**.20**

No. H-18010 Mueller Reamers

For Use with Mueller Copper Service Pipe

A convenient tool for reaming inside of pipe after cutting.

No. H-**18010**....................each **$1.50**

No. 108E Hays "90" Corporation Stops

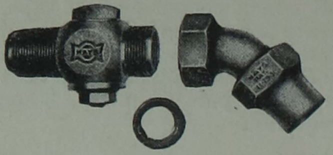
For Copper Pipe

Inlet water works standard thread (Mueller); outlet copper pipe tapped for male screw plug.

Size.........in.	½	⅝x¾	¾	1	1¼	1½	2
No. 108E....each	$1.60	2.25	2.85	4.50	10.00	16.00	26.50

No. 108F Hays 90 Corporation Stops

For Copper Pipe

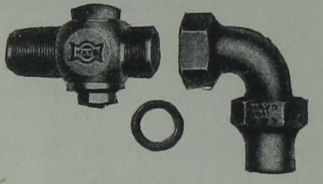


Inlet water works standard thread (Mueller); outlet tapped for male screw plug, with ⅛ bend double seal joint coupling for copper pipe (with gasket).

Size.........in.	½	⅝x¾	¾	1	1¼	1½	2
No. 108F....each	$2.25	3.00	3.50	5.45	13.05	21.80	35.20

No. 108G Hays 90 Corporation Stops

For Copper Pipe

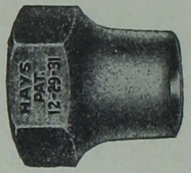


Inlet water works standard thread (Mueller); outlet tapped for male screw plug, with ¼ bend double seal joint coupling for copper pipe (with gasket).

Size.........in.	½	⅝x¾	¾	1	1¼	1½	2
No. 108G....each	$2.50	3.25	3.75	5.50	13.45	21.80	35.20

No. 108U Hays Copper Service Nuts

For Copper Pipe

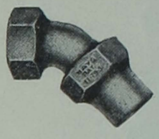


Size Inches	Each	Size Inches	Each
½	$.24	1¼	$.84
¾	.36	1½	1.32
1	.48	2	2.16

No. 120V Hays ⅛ Bend Double Seal Joint Couplings

For Copper Pipe

Complete with gasket.

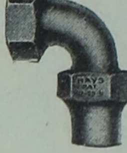


Size In.	Each	Size In.	Each
½	$.77	1¼	$2.28
⅝x¾	1.01	1½	4.08
¾	1.01	2	6.12
1	1.51	...	....

No. 120W Hays ¼ Bend Double Seal Joint Couplings

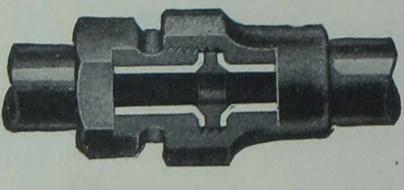
For Copper Pipe

Complete with gasket.



Size In.	Each	Size In.	Each
½	$.96	1¼	$2.52
⅝x¾	1.20	1½	4.08
¾	1.20	2	6.12
1	1.56	...	....

No. 120S Hays Unions

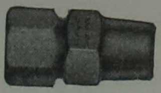


Two-part double seal copper to copper union.

Size In.	Each	Size In.	Each
½	$.66	1¼	$2.43
¾	.87	1½	4.35
1	1.26	2	5.67

Hays Copper Pipe Service Connections

No. 120-F



Listed size copper pipe to corresponding size female iron pipe.

Size..........inches	½	¾	1	1¼	1½	2
No. 120-F.......each	$.58	.79	1.20	1.75	3.24	5.04

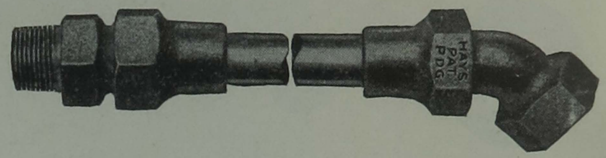
No. 120-G

Listed size copper pipe to corresponding size male iron pipe.

Size..........inches	½	¾	1	1¼	1½	2
No. 120G.......each	$.58	.79	1.20	1.75	3.24	5. 4

Hays Copper Service Goosenecks

No. 119E, ⅛ Bend—No. 119K, ¼ Bend



Increased I.P. adapter to listed size male I.P. coupling with double seal copper connections.

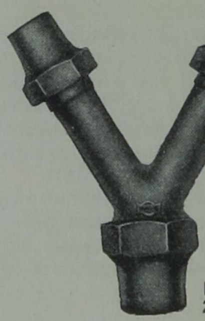
Made in ½, *⅝x¾, ¾, 1, 1¼, 1½ and 2-inch sizes.

Prices upon application.

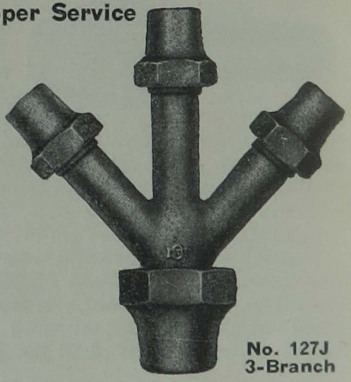
*Gooseneck is furnished for ⅝-inch corporation stops with water works standard (Mueller) or increased I.P. on outlet end and are furnished with ¾-inch copper pipe.

Hays Y Branch Connections

For Copper Service



No. 127H
2-Branch



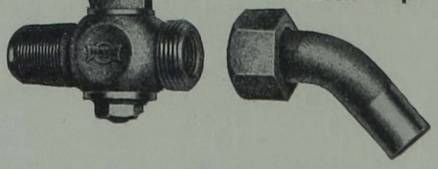
No. 127J
3-Branch

Can also be furnished with 4-branch connections. Prices upon application.

Hays Corporation Stops

For Lead Pipe

No. 107B



Inlet and outlet water works standard thread (Mueller), tapped for male screw plug, with *⅛ bend coupling.

Size..........in.	½	⅝	¾	1	1¼	1½	2
No. 107B.....each	$1.60	2.25	2.85	4.50	10.00	16.00	26.50

No. 108S

Inlet water works standard thread (Mueller); outlet iron pipe one size larger than body (increased I.P.) tapped for male screw plug, complete with *⅛ bend coupling.

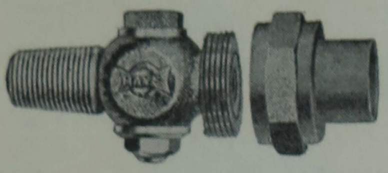
Size..........in.	½	†⅝	¾	1	1¼	1½	2
No. 108S.....each	$1.60	2.25	2.85	4.50	10.00	16.00	26.50

*Straight or quarter bend coupling will be substituted without additional charge. Specify when ordering.

†Outlet thread on ⅝ inch size is ¾ inch.

No. 115A Hays Corporation Stops

With Lead Flange Coupling—Screw Plug



For standard Water Works tapping machines. Inlet Water Works standard thread, outlet lead flange.

For extra strong lead pipe.

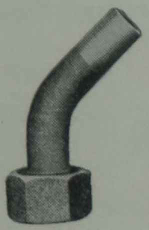
Size........inches	½	⅝	¾	1	1¼	1½	2
No. 115A.....each	$2.25	3.05	3.85	6.00	12.75	20.00	32.25

Couplings for other weight lead pipe, at extra charge.

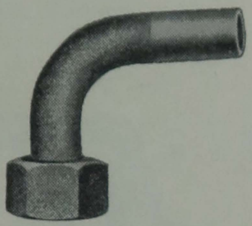
Hays Corporation Stop Couplings

For Lead Pipe

No. 120A, Straight



No. 120B, ⅛ Bend



No. 120C ¼ Bend

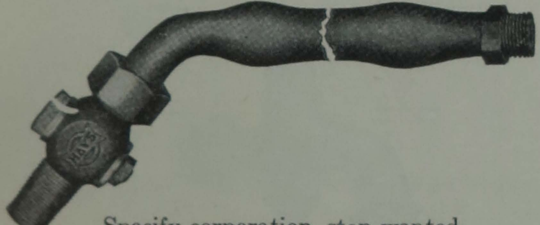
Size........inches	½	⅝	¾	1	1¼	1½	2
Each.............	.50	.60	.75	1.00	1.50	2.00	3.50

Order should specify No. of stop on which couplings are to be used.

Couplings can be furnished with male i.p. threads at additional charge.

No. 119A Lead Goose Necks

With Wiped Joint Ends and Solder Nipples

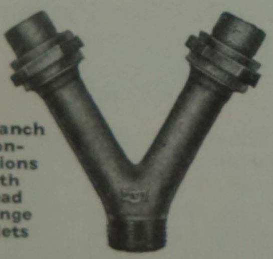


Specify corporation stop wanted.

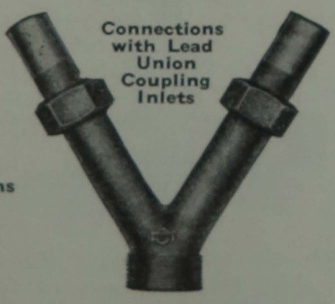
Size In.	Lgth. L. P. In.	Price, Each With Corp. Stop	Price, Each Without Corp. Stop	Size In.	Lgth. L. P. In.	Price, Each With Corp. Stop	Price, Each Without Corp. Stop
½	18	$5.25	$4.85	1¼	24	$19.50	$16.20
⅝	18	6.25	5.40	1½	30	31.00	25.50
¾	18	7.25	6.25	2	36	48.50	38.50
1	18	10.75	9.20	...	..	.....	.....

Hays Branch Connections

Lead and Iron Pipe Lead Flanges



2-Branch Connections with Lead Flange Inlets



Connections with Lead Union Coupling Inlets

2-Branch Connections with Lead or Iron Pipe Inlets

Can be furnished in any combination and no. of branches. Prices upon application.

No. 85E Hays Ground Key Curb Stops

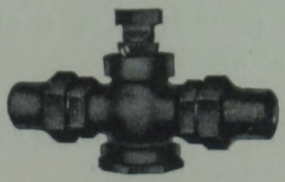
For Copper Service

Inverted key, Minneapolis pattern, round way, double seal copper connections both ends, brass T handle.

Size, In.	Each	Size, In.	Each
½	$4.95	1¼	$20.05
¾	8.10	1½	30.95
1	12.05	2	50.00

No. 82E Hays Ground Key Curb Stops

For Copper Service

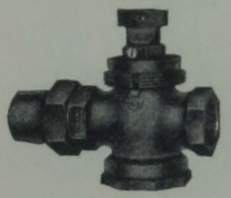


Inverted key, round way, double seal copper connections both ends, brass T handle.

Size, In.	Each	Size, In.	Each
½	$4.55	1¼	$19.05
¾	7.60	1½	29.45
1	11.40	2	47.50

No. 85C Hays Ground Key Curb Stops

For Copper Service

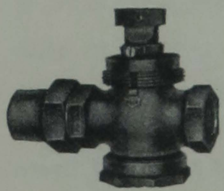


Inverted key, Minneapolis pattern, round way, double seal copper inlet x female I.P. outlet, brass T handle.

Size, In.	Each	Size, In.	Each
½	$4.15	1¼	$16.55
¾	6.75	1½	25.95
1	10.05	2	42.75

No. 82C Hays Ground Key Curb Stops

For Copper Service



Inverted key, round way, double seal copper inlet x female I.P. outlet, brass T handle.

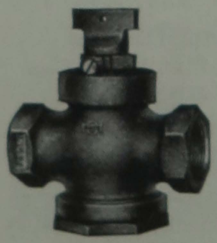
Size, In.	Each	Size, In.	Each
½	$3.75	1¼	$15.55
¾	6.25	1½	24.45
1	9.40	2	40.25

No. 85A Hays Ground Key Curb Stops

Minneapolis Pattern

Inverted key, round way, female I.P., brass T handle.

Size..........in.	½	⅝	¾	1	1¼	1½	2
No. 85A......each	$3.35	4.25	5.40	8.05	13.05	20.95	35.50



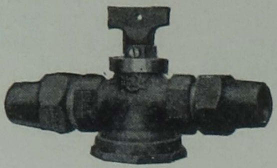
No. 82A Hays Ground Key Curb Stops

Inverted key, round key, female I.P., brass T handle.

Size, In.	Each	Size, In.	Each
½	$2.95	1¼	$12.05
⅝	3.80	1½	19.45
¾	4.90	2	33.00
1	7.40	...	.....

Hays Stops and Stops and Drains

No. 82E Stop



Brass tee handle, socket head, inverted key; roundway stop. Inlet and outlet copper pipe.

Size......inches	½	¾	1	1¼	1½	2
No. 82E.....each	$4.55	7.60	11.40	19.05	29.45	47.50

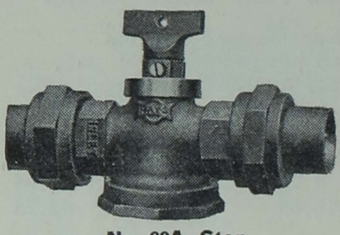
No. 82F Stop and Drain

Stop and drain.

Size......inches	½	¾	1	1¼	1½	2
No. 82F.....each	$4.60	7.65	11.50	19.20	29.70	48.00

Hays Inverted Key Curb Stops

Round Way—For Lead Flange Both Ends



No. 89A, Stop

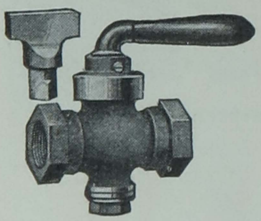
No. 89B, Stop and Drain

Size......inches	½	⅝	¾	1	1¼	1½	2
No. 89A, Stop.....each	$4.55	$6.00	$7.60	$11.40	$19.05	$29.45	$47.50
No. 89B, Stop and Drain.each	4.60	6.05	7.65	11.50	19.20	29.70	48.00

Patent Guard Stops and Stop and Drains

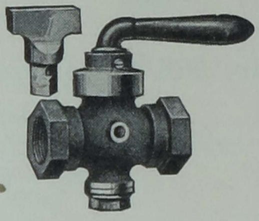
Tee or Lever Handle—Flat Way—For Iron Pipe Ground Key

No. 8000 Stop



Size In.	Price Each	Size In.	Price Each
½	$1.75	1¼	$6.85
⅝	2.30	1½	11.65
¾	2.75	2	20.20
1	4.15	...	....

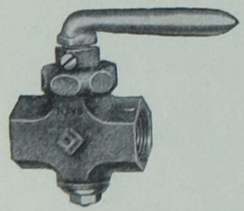
No. 8010 Stop and Drain



Size In.	Price Each	Size In.	Price Each
½	$1.80	1¼	$7.00
⅝	2.35	1½	11.80
¾	2.80	2	20.35
1	4.25	...	.....

Hexo Ground Key Straightway Stops and Drains

Cap Pattern

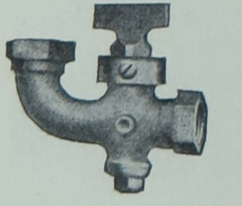


Lever handle furnished unless otherwise specified. No. 12H is a Stop and Drain, No. 12G Stop only.

Size, Inches.....	½	⅝x¾	1
No. 12H....each	$1.80	$2.50	$3.05
No. 12G....each	1.75	2.45	3.00

No. 92A Hydrant Stop and Drains

For Iron Pipe—Flat Way—Cap Pattern

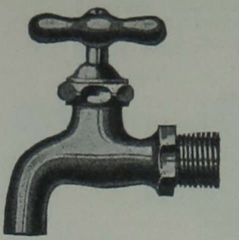


With loose tee handle.

Size In.	Each	Size In.	Each
½	$2.15	1¼	$8.65
⅝	3.05	1½	14.20
¾	3.75	2	24.00
1	5.40	...	.....

Compression Plain Faucets

For Iron Pipe

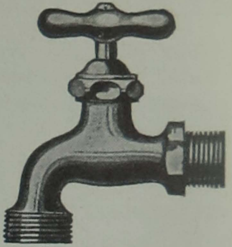


Size Inches	Finished Each	Nickel Plated Each
⅜	$1.20	$1.30
½	1.40	1.50
¾	1.60	1.80
1	3.30	3.60
1¼	6.40	6.80

Compression Hose Faucets

For Iron Pipe

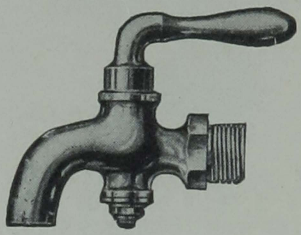
No. 7001



Size Inches	Finished Each	N. P Each
½	$1.60	$1.70
¾	1.80	2.00
1	3.75	4.05
1¼	7.05	7.45

No. 8360 Ground Key Plain Faucets

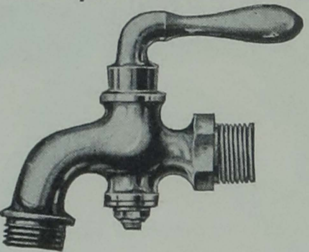
For Iron Pipe



Size In.	Price, Each Rough	Fin-ished	Nickel-Plated	Add for Hose End
¼	$1.20	$1.50	$ 1.80	....
⅜	1.25	1.55	1.85	....
½	1.30	1.60	1.90	$.20
⅝	1.85	2.20	2.60	.20
¾	2.25	2.80	3.40	.20
1	3.30	4.05	4.80	.45
1¼	5.60	6.70	7.85	.65
1½	9.30	11.20	13.10	.95
2	16.10	18.75	21.35	1.40

No. 8362 Ground Key Hose Faucets

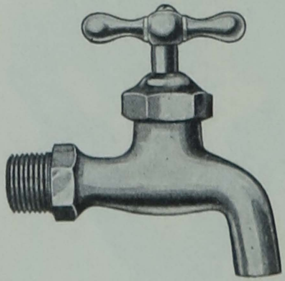
For Iron Pipe—Plain Lever Handle



Size In.	Price, Each Rough	Fin-ished	Nickel-Plated	Size In.	Price, Each Rough	Fin-ished	Nickel-Plated
½	$1.50	$1.80	$2.10	1¼	$6.25	$7.35	$8.50
⅝	2.05	2.40	2.80	1½	10.25	12.15	14.05
¾	2.45	3.00	3.60	2	17.50	20.15	22.75
1	3.75	4.50	5.25	...	.....	.....	.....

Hays Standard Compression Faucets

Iron Pipe



No. 143A

With T handle; plain, male iron pipe. Made in ⅜, ½, ¾ and 1-inch sizes. All ½ and ¾-inch faucets can be furnished with stuffing box. The 4-ball and China lever handle faucets will be furnished with China indexes unless otherwise specified.

Prices upon application.

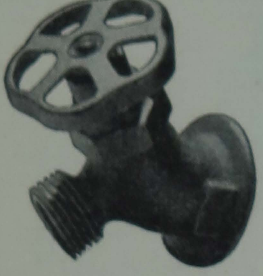
No. 145A

With T handle; hose, male iron pipe. Made in ½, ¾ and 1-inch sizes.

Prices upon application.

No. 178H Hays Tip-Top Lawn Faucets

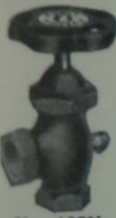
Key Wheel Pattern



Made in ½ and ¾-inch sizes.
Rough nickel plate finish.
Prices upon application.

Signet Angle Pattern Stops and Stops and Drains

With Dome Bonnet

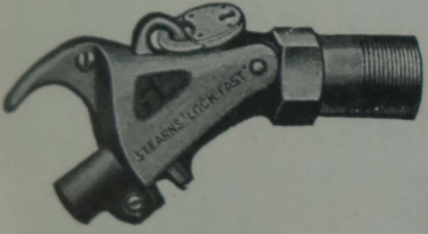


No. 185N

Furnished with 1 drain control and packed 3 right and 3 left in a carton.

Size.............in	½	¾x½	¾	1
No. 185N, Stop and Drain.each	$.51	$.58	$.58	$1.61
No. 185Q, Stop.ea.	.48	.55	.55	1.57

Lockfast Oil and Molasses Gates



Locking gates furnished up to 2-inch inclusive.

Wood thread has tapered shank. Iron pipe thread has straight shank.

Prices do not include padlock.

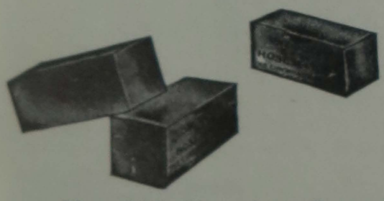
Style A

Wood Thread			
Size In.	Per Doz. Jap.	Size In.	Per Doz. Jap.
½	$16.50	1¼	$20.35
¾	17.00	1½	24.20
1	17.60	2	33.00

Style E

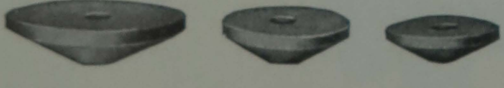
U. S. or Whitworth Pipe Thread			
Size In.	Per Doz. Jap.	Size In.	Per Doz. Jap.
½	$16.50	1¼	$20.35
¾	17.00	1½	24.20
1	17.60	2	33.00

No. 1220 Rubber Hose Washers



Size Inches	Price per Dozen
¾	$.15
1	.20
1¼	.30
1½	.40
2	.60

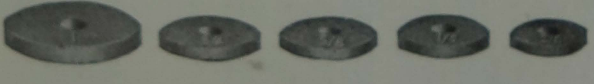
No. 300 Beveled Seat Bibb Washers



Improved style, made of high grade rubber and asbestos compound, for hot or cold water. *Large.

Size...in.	¼	⅜	*⅜	½	*½	⅝	¾	1
Per 100..	$1.80	1.90	2.00	2.10	2.50	2.80	3.40	4.20

No. 122 Flat Bibb Washers



Made of high grade rubber and asbestos compound, for hot or cold water. Packed 100 in a box.

Size..........inches	¼	⅜	½	⅝	¾	1
Price........per 100	$1.80	1.90	2.00	2.20	2.40	2.80

SCOTT VALVES

Copper to Copper End

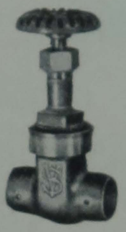
•

For use with Streamline and all other makes of standard size copper pipe, copper to copper sweat joint and soldered joint equipment.

No. 60-M Scott Standard Gate Valves

Copper to Copper

For 100 Pounds Steam Working Pressure

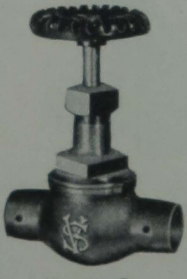


Size Inches	Each	Size Inches	Each
⅜	$2.25	1¼	$4.50
½	2.25	1½	5.75
¾	2.75	2	8.00
1	3.50	...	....

Scott Standard Globe and Angle Valves

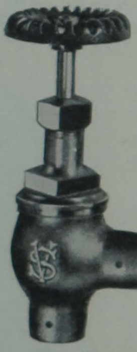
Copper to Copper

For 100 Pounds Steam Working Pressure



No. 60-G Globe

Size Inches	Each
⅜	$1.75
½	2.00
¾	2.50
1	3.25
1¼	4.25
1½	5.50
2	8.00

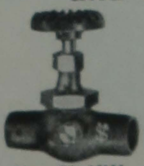


No. 60-A Angle

Scott Standard Compression Stops and Compression Stop and Waste

Copper to Copper

For 100 Pounds Steam Working Pressure



No. 60-KW

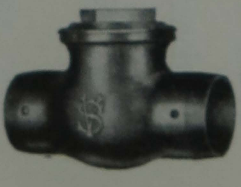
Size.............inches	⅜	½	¾	1
Stop, No. 60-KS ...ea.	$1.75	2.00	2.50	3.25
Stop and Drain, No. 60-KW.ea.	....	$2.10	2.60	3.25

No. 60-C Scott Standard Swing Check Valves

Copper to Copper

For 100 Lbs. Steam Working Pressure

For horizontal and vertical lines.

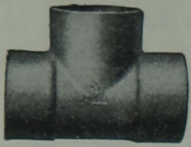


Size Inches	Each	Size Inches	Each
½	$2.00	1¼	$4.00
¾	2.50	1½	5.25
1	3.25	2	7.50

Chase Copper Sweat Fittings

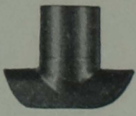
Tees

***No. C-411**
Cast Tee
Copper to Copper to Copper



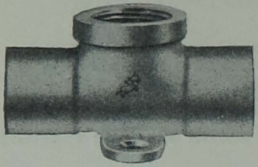
Size In.	Each	Size In.	Each
⅜	$.20	2	$1.50
½	.24	2½	2.00
¾	.38	3	3.00
1	.55	3½	4.00
1¼	.75	4	5.00
1½	1.00	...	....

***No. 411**
Wrought Tee
Saddle Type



Size In.	Each	Size In.	Each
⅜	$.10	1½	$.50
½	.12	2	.72
⅝	.15	...	...
¾	.19	...	...
1	.24	...	...
1¼	.33	...	...

No. C-412-D
Cast Tee
Drop Ear
Copper to Female S.P.S.



Copper In.	S.P.S. In.	Each
½	½	$.36
½	⅜	.36

***No. C-412**
Cast Tee
Copper to Female S.P.S.

Copper In.	S.P.A. In.	Each
⅜	⅜	$.20
½	½	.24
¾	¾	.38
1	1	.55
1¼	1¼	.75
1½	1½	1.00
2	2	1.50
2½	2½	2.00
3	3	3.00
4	4	5.00

Elbows

Copper to Copper

***No. 407**
Wrought 90° Elbow
For Sizes Up to 2 Inches

Size In.	Each	Size In.	Each
⅛	$.10	1	$.40
¼	.14	1¼	.55
⅜	.16	1½	.70
½	.20	2	1.00
⅝	.24	...	...
¾	.28	...	...

***No. 407-A**
Wrought 45° Elbow
For Sizes Up to 2 Inches

Size In.	Each	Size In.	Each
¼	$.14	1	$.40
⅜	.16	1¼	.55
½	.20	1½	.70
⅝	.24	2	1.00
¾	.28	...	....
..	...	...	....

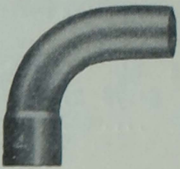
No. C-407
Cast 90° Elbow
For Sizes Over 2 Inches

2½	$1.65	3½	$3.40
3	2.50	4	4.50

No. C-407-A
Cast 45° Elbow
For Sizes Over 2 Inches

2½	$1.65	3½	$3.40
3	2.50	4	4.50

No. 407-S
Wrought 90° Street Elbow



Size In.	Each	Size In.	Each
⅛	$.10	1	$.40
¼	.14	1¼	.55
⅜	.16	1½	.70
½	.20	2	1.00
⅝	.24	...	...
¾	.28	...	...

No. 407-AS
Wrought 45° Street Elbow

Size In.	Each	Size In.	Each
¼	$.14	1¼	$.55
⅜	.16	1½	.70
½	.20	2	1.00
⅝	.24	...	....
¾	.28	...	...
1	.40	...	....

*Straight sizes only are shown. Prices and information on reducing sizes on application.

Chase Copper Sweat Fittings

Elbows

Continued

***No. C-408**
Cast 90° Elbow
Copper to Female S.P.S.

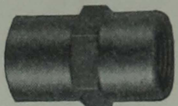
Copper In.	Each	S.P.S. In.
⅜	$.17	⅜
½	.25	½
¾	.37	¾
1	.50	1
1¼	.60	1¼
1½	.70	1½
2	1.00	2
2½	1.65	2½
3	2.50	3
4	4.50	4

***No. C-409**
Cast 90° Elbow
Copper to Male S.P.S.

Copper In.	Each	S.P.S. In.
⅜	$.17	⅜
½	.25	½
¾	.37	¾
1	.50	1
1¼	.60	1¼
1½	.70	1½
2	1.00	2
2½	1.65	2½
3	2.50	3
4	4.50	4

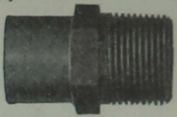
Adapters

***No. 403**
Wrought Female Adapter
For Sizes Up to 1½ Inches
Copper to Female S.P.S.



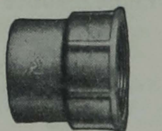
⅛	$.07	⅛
¼	.14	¼
⅜	.16	⅜
½	.18	½
¾	.24	¾
1	.32	1
1¼	.50	1¼
1½	.60	1½

***No. 404**
Wrought Male Adapter
For Sizes Up to 2 Inches
Copper to Male S.P.S.



⅛	$.07	⅛
¼	.14	¼
⅜	.16	⅜
½	.18	½
¾	.24	¾
1	.32	1
1¼	.50	1¼
1½	.60	1½
2	.90	1½

***No. C-403**
Cast Female Adapter
For Sizes Up to 4 Inches
Copper to Female S.P.S.

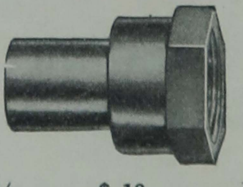


½	$.18	½
¾	.24	¾
1	.32	1
1¼	.50	1¼
1½	.60	1½
2	.90	2
2½	1.30	2½
3	2.00	3
4	3.50	4

***No. C404**
Cast Male Adapter
For Sizes Up to 4 Inches
Copper to Male S.P.S.

½	.18	½
¾	.24	¾
1	.32	1
1¼	.50	1¼
1½	.60	1½
2	.90	2
2½	1.30	2½
3	2.00	3
4	3.50	4

No. 403-S
Female Street Adapter
Wrought
Copper to Female S.P.S.

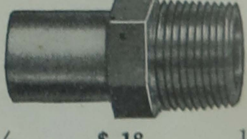


½	$.18	½
½	.18	⅜
¾	.24	¾

No. C-403-S
Cast

1	$.32	1
1¼	.50	1¼
1½	.60	1½
2	.90	2
2½	1.30	2½
3	2.00	3
4	3.50	4

No. 404-S
Male Street Adapter
Wrought
Copper to Male S.P.S.



½	$.18	½
¾	.24	¾
1¼	.50	1¼
1½	.60	1½

No. C-404-S Cast

1	$.32	1
1¼	.50	1¼
1½	.60	1½
2	.90	2
2½	1.30	2½
3	2.00	3
4	3.50	4
5	7.00	5
6	10.00	6

*Straight sizes only are shown. Prices and information on reducing sizes upon application.

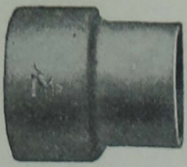
Chase Copper Sweat Fittings

Couplings

***No. 401**
Wrought Coupling
For Sizes Up to 4 Inches
Copper to Copper

Copper In.	Each	Copper In.	Each
1/8	$.05	1 1/4	$.24
1/4	.06	1 1/2	.28
3/8	.08	2	.46
1/2	.11	2 1/2	.65
5/8	.12	3	.85
3/4	.15	3 1/2	1.30
7/8	.18	4	1.50
1	.20	...	....

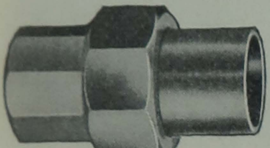
No. C-401-R
Cast Coupling
For Sizes Over 2 Inches
Copper to Copper



Copper In.	Each	Copper In.	Each
2 1/2x2	$1.30	3 1/2x3	$2.50
3 x2 1/2	2.00	.....	.....

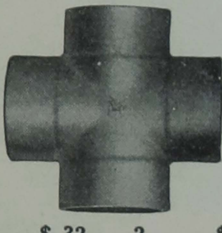
Unions and Crosses

No. C-402
Cast Union
For Sizes Up to 4 Inches
Copper to Copper



3/8	$.55	2	$1.87
1/2	.60	2 1/2	5.50
5/8	.70	3	8.65
3/4	.75	3 1/2	13.95
1	.94	4	18.10
1 1/4	1.12	...	.....
1 1/2	1.56	...	.....

†No. C-435
Cast Cross
Copper to Copper to Copper to Copper
For Sizes Up to 4 Inches



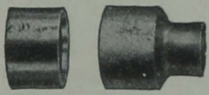
3/8	$.32	2	$2.00
1/2	.36	2 1/2	3.00
3/4	.65	3	4.50
1	.90	3 1/2	6.00
1 1/4	1.15	4	7.50
1 1/2	1.50	...	....

Caps and Bushings

No. 416-C
Wrought Cap
For Sizes Up to 4 Inches

1/4	$.06	1 1/2	$.28
3/8	.08	2	.46
1/2	.11	2 1/2	.65
5/8	.12	3	.85
3/4	.15	3 1/2	1.30
1	.20	4	1.50
1 1/4	.24	...	....

***No. 417**
Bushing or Reducer
For Sizes Up to 4 Inches

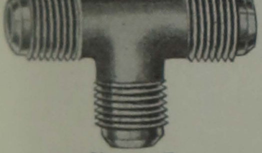


1/4x1/8	$.06	1 1/2x 3/4	$.60
3/8x1/8	.08	2 x1	.90
1/2x1/4	.11	2 1/2x1 1/4	1.30
3/4x3/8	.15	3 x1 1/2	2.00
1 x1/2	.32	3 1/2x3	2.00
1 1/4x1/2	.50	4 x2	3.50
......	...	....	....

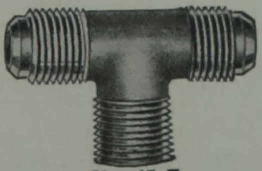
*Straight sizes only are shown. Prices and information on reducing sizes upon application.

†Reducing crosses are special. No. **417** can be used to make reductions.

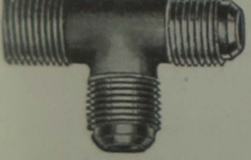
Imperial 3-Way Tees



No. 44-F



No. 45-F



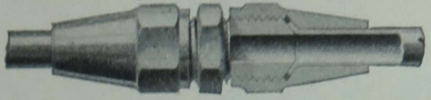
No. 51-F

O.D. Tube In.	S.A.E. Thread In.	*Pipe Thread In.	No. 44-F Per 100	No. 45-F Per 100	No. 51-F Per 100
1/4	7/16x20	1/8	$26.00	$25.00	$27.00
5/16	1/2x20	1/8	33.00	32.00	33.00
3/8	5/8x18	1/4	52.00	52.00	50.00
7/16	11/16x16	1/4	70.00	75.00	74.00
1/2	3/4x16	3/8	79.00	88.00	81.00
5/8	7/8x14	1/2	235.00	226.00	226.00
3/4	1 x14	1/2	272.00	255.00	254.00

*Except No. 44-F.

Imperial S.A.E. Tube Couplings

For Connecting Brass and Copper Tubing

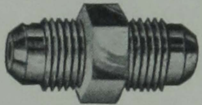


No. 41-F Union Nut

Std. Lgth. In.	O.D. Tube In.	S.A.E. Thread In.	Per 100
13/16	3/16	3/8x24	$11.00
3/4	1/4	7/16x20	12.00
15/16	1/4	7/16x20	*13.00
3/4	5/16	1/2x20	15.00
1 1/8	5/16	1/2x20	*17.00
1 5/16	3/8	5/8x18	22.00
1 5/16	3/8	5/8x18	*25.00
1 1/2	7/16	11/16x16	34.00
1 1/8	1/2	3/4x16	40.00
1 5/8	1/2	3/4x16	*46.00
1 7/8	5/8	7/8x14	74.00
2 3/16	3/4	1 x14	101.00

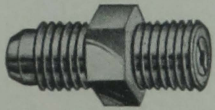
*Unless Specified, long nut will be furnished.

No. 42-F Union Coupling



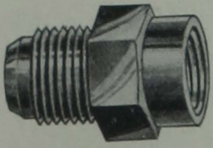
O.D. Tube In.	S.A.E. Thread In.	Per 100
3/16	3/8x24	$18.00
1/4	7/16x20	19.00
5/16	1/2x20	23.00
3/8	5/8x18	35.00
7/16	11/16x16	45.00
1/2	3/4x16	55.00
5/8	7/8x14	92.00
3/4	1 x14	130.00

No. 43-F Ball Check Valve



O.D. Tube In.	S.A.E. Thread In.	Pipe Thread In.	Per 100
1/4	7/16x20	1/8	$31.00
5/16	1/2x20	1/8	35.00
3/8	5/8x18	1/4	48.00
7/16	11/16x16	1/4	57.00
1/2	3/4x16	3/8	68.00

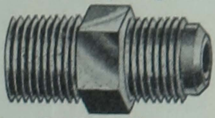
Female Couplings



No. 46-F

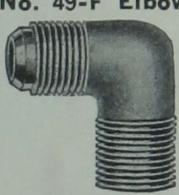
O.D. Tube In.	S.A.E. Thread In.	Pipe Thread In.	Per 100
1/4	7/16x20	1/8	$17.00
5/16	1/2x20	1/8	20.00
3/8	5/8x18	1/4	32.00
7/16	11/16x16	1/4	43.00
1/2	3/4x16	3/8	52.00
5/8	7/8x14	1/2	112.00
3/4	1 x14	1/2	165.00
		No. 47-F	
1/4	7/16x20	1/4	$24.00
5/16	1/2x20	1/4	26.00
3/8	5/8x18	3/8	51.00
7/16	11/16x16	3/8	55.00
1/2	3/4x16	1/2	73.00

No. 48-F Half Union Coupling



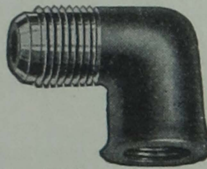
O.D. Tube In.	S.A.E. Thread In.	Pipe Thread In.	Per 100
3/16	3/8x24	1/8	$12.00
1/4	7/16x20	1/8	13.00
1/4	7/16x20	1/4	22.00
5/16	1/2x20	1/8	17.00
5/16	1/2x20	1/4	24.00
3/8	5/8x18	1/4	35.00
3/8	5/8x18	1/8	32.00
7/16	11/16x16	1/4	38.00
1/2	3/4x16	3/8	45.00
5/8	7/8x14	1/2	90.00
3/4	1 x14	1/2	100.00

No. 49-F Elbow



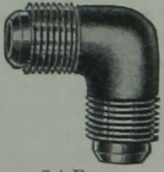
O.D. Tube In.	S.A.E. Thread In.	Pipe Thread In.	Per 100
3/16	3/8x24	1/8	$19.00
1/4	7/16x20	1/8	20.00
1/4	7/16x20	1/4	29.00
5/16	1/2x20	1/8	23.00
5/16	1/2x20	1/4	35.00
3/8	5/8x18	1/8	41.00
3/8	5/8x18	1/4	44.00
7/16	11/16x16	1/4	52.00
1/2	3/4x16	3/8	60.00
5/8	7/8x14	1/2	140.00
3/4	1 x14	1/2	190.00

No. 50-F Elbow



O.D. Tube In.	S.A.E. Thread In.	Pipe Thread In.	Per 100
1/4	7/16x20	1/8	$25.00
5/16	1/2x20	1/8	28.00
3/8	5/8x18	1/4	61.00
7/16	11/16x16	1/4	85.00
1/2	3/4x16	3/8	113.00
5/8	7/8x14	1/2	172.00

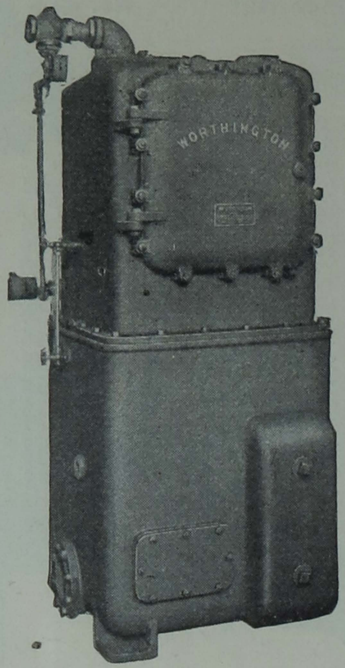
No. 55-F Elbow



O.D. Tube In.	S.A.E. Thread In.	Per 100
1/4	7/16x20	$24.00
5/16	1/2x20	25.00
3/8	5/8x18	37.00
7/16	11/16x16	51.00
1/2	3/4x16	55.00
5/8	7/8x14	136.00
3/4	1 x14	156.00

Worthington Open Type Feed Water Heaters

Stilwell Pattern



The Worthington Open Type Stationary Feed Water Heater is also a feed water purifier, De-aerator, softener and condensation receiver. It is built in all sizes to deliver the required pounds of water per hour.

The heater is of the counter current type, steam rising, water falling, thus giving the best means of absorbing heat from the steam by the water. Steam entering the heater passes through the oil separator, to the mixing chamber. The water to be heated enters the top of the heater through an automatically controlled valve which maintains a steady uniform flow. A series of pans breaks up the water into a number of fine streams which absorb the heat of the steam. The water then flows through a large filter of the 2-pass type, passing upward through the first pass and downward through the second pass to the pump suction opening. Each heater is provided with a separate cast oil separator fitted with vertically ribbed baffle. The separator may be of either the thorofare type or the switch valve type, the latter being used where it is necessary at times to by-pass a part or all of the exhaust steam for heating or process work. The overflow may be of either the water sealed type or the trapped type. The trapped type is used where heater operates under pressure.

When properly installed and supplied with a sufficient quantity of exhaust steam this heater will supply its rated capacity of feed water entirely suitable for boiler feeding at a temperature within 2 to 5 degrees of the temperature of the incoming steam, without causing additional back pressure on the exhaust line, and will control automatically the amount of make up water required by the boilers.

For data necessary to make a proposal, the answers to the following questions should be given:

Number, kind, size and rating of boilers.

What is approximate quantity of exhaust steam available in pounds per hour?

Is exhaust steam used in heating or drying system?

What backpressure, if any, in pounds per square inch is carried in the exhaust?

What is the source of water supply? City, well or river?

What is the pressure of the water supply in pounds per square inch?

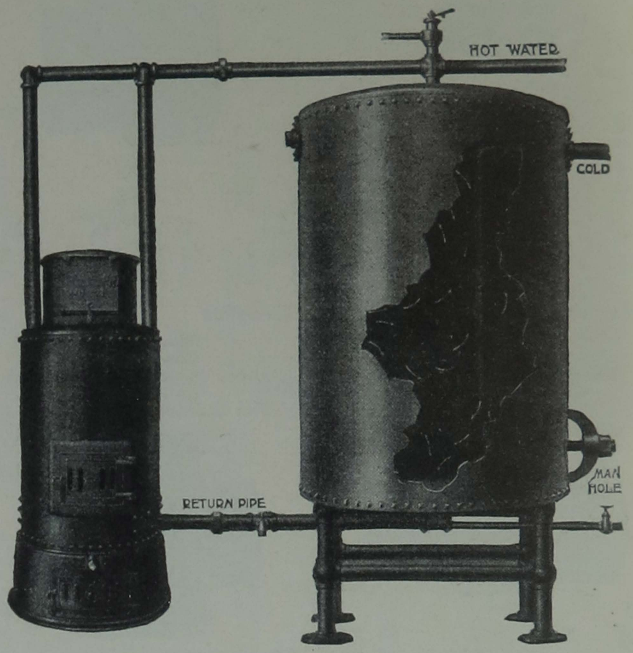
What is average initial temperature of water supply?

How many gallons of hot water are required per hour for industrial purposes and exclusive of boiler feed?

Prices and further information furnished upon application.

Extra Heavy Tabasco Heaters and Tanks

For 100 Pounds Working Pressure



Specifically adapted to fill Government requirements these Extra Heavy Heaters are built for water working pressures up to 100 pounds, making them ideal for cities where the water pressure is above the average.

Continuous service of piping hot water is best supplied by Kewanee Water Heaters when the water storage tank has a capacity 50 per cent greater than the hourly capacity of the heater.

Equipped with Tabasco Improved Rocking Grate, a sectional clinker-cutting, dumping grate.

Heaters

	Each						Approx. Shipping Wt., Lbs.	
No.	Magazine Feed with Fire Tools	For Surface Burner Type	Cap. per Hour Gal.	Total Ht. In.	Diam. Fire Pot In.	Size Flow and Return, In.	Magazine Feed	Surface Burner
150	**$190.00**	**$186.00**	150	61	12	2–1¼	520	590
200	**210.00**	**206.00**	200	55	16	2–1½	600	700
300	**240.00**	**235.00**	300	63	20	2–2	880	1030
400	**260.00**	**254.00**	400	75	20	2–2	1050	1200
500	**320.00**	**314.00**	500	70	25	2–2½	1220	1400
600	**340.00**	**333.00**	600	76	25	2–2½	1420	1620
700	**360.00**	**353.00**	700	85	25	2–2½	1510	1700

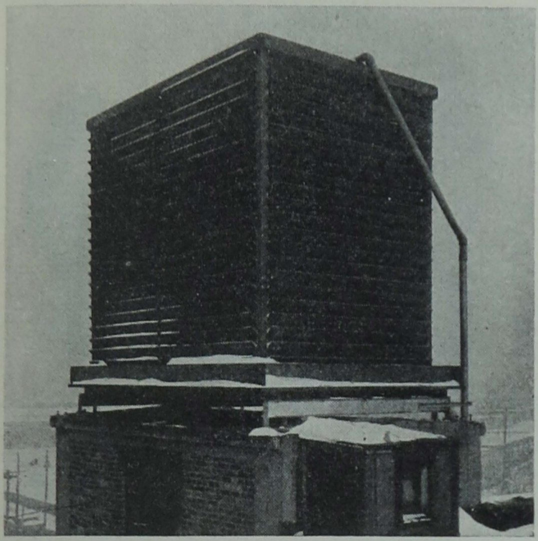
Tanks and Stands

	Each				Wt., Lbs.	
Size In.	Tank with Manhole	Stand	Cap. Gal.	Total Ht. In.	Tank	Stand
36x60	**$300.00**	**$76.00**	265	86	1000	160
42x60	**350.00**	**78.00**	360	87	1300	180
48x60	**400.00**	**84.00**	470	88	1500	200
54x60	**500.00**	**90.00**	590	89	2000	220
60x60	**580.00**	**96.00**	730	90	2400	250
60x66	**600.00**	**96.00**	800	96	2500	250
60x72	**620.00**	**96.00**	875	102	2600	250

If manhole is not wanted deduct $45.00 from price.

All Tabasco Heaters are supplied with brass clean-out plugs.

Schubert-Christy Spray Towers



Made in all capacities from 5 G.P.M. to 1500 G.P.M. inclusive. Ideal for service in connection with air conditioning, air compressors, bakeries, dairies, beverage plants, breweries, diesel engine cooling, ice plants and refrigeration and are arranged for installation on the ground or roof of buildings. Shipped knocked-down.

Spraytowers are of the completely louvred down-spray design, constructed of rust-proofed and rot-resisting materials throughout. Wood portions are made from clear all-heart California redwood. Metal parts have been reduced to a minimum and the few remaining have been double-cadmium plated or otherwise treated. These towers are manufactured in standard sections 3, 4, 5, 6 and 8 feet wide, making it possible to obtain any desired tower size by simply combining these sections. It is recommended that the maximum tower width be held at 12 feet but the length may be made to suit the requirements. It is desirable to place the tower so that its longest dimension is at right angles to the direction of the prevailing winds and that these winds have access to the tower. Towers can be installed on the ground or in concrete, wood or steel basin on the roof of a building. Their light weight and strong design makes them ideal for installation on existing roofs of medium strength. The size and capacity of any tower can be increased or decreased at any time by adding or rearranging sections.

Towers can also be constructed of tide water cypress, cedar, pine, fir, copper bearing steel, blue annealed steel, galvanized metal, armco ingot iron, allegheny metal, brass or copper, aluminum, toncan metal and special alloys.

Ordering Information

1. Quantity of water to be cooled.
2. Temperature of the water to be cooled.
3. Temperature to which water is to be cooled.
4. Location of the cooling tower.
5. Will a pan be required with the cooling tower.

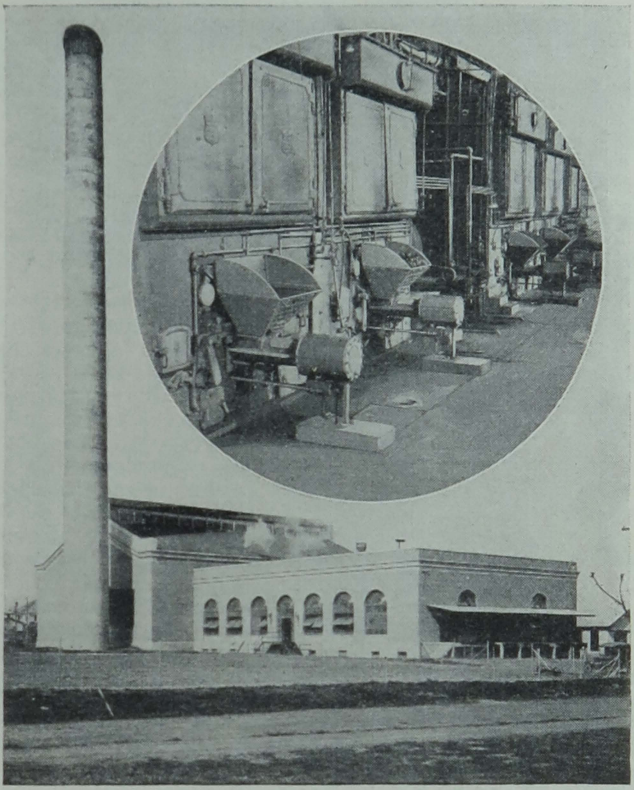
Gas Fired Steam and Hot Water Boilers

The gas fired boiler has many advantages. It is clean and has no soot or smoke.

It can be readily adapted to automatic control either Time or Thermostatic, or both.

Let us supply your gas boiler requirements.

Mechanical Stokers



The type of stoker needed is determined by the size of boilers, fuel, load conditions and other local factors.

The Riley & Jones Underfeed Stokers, Murphy Automatic Furnaces and Harrington Traveling Grate Stokers give a choice that will meet any condition.

The Riley & Jones Stokers are designed for burning coal on the underfeed principle. Air is supplied along the top of the retort through tuyeres, thus combustion takes place above the incoming green fuel, so that the heat draws off the volatiles from the fresh fuel beneath. These volatiles rising through the incandescent zone are fully burned and the coal becomes coked before it rises to the combustion zone. The result is highly efficient, economical and smokeless combustion.

The Murphy Furnace is of the V-type, overfeed design with sprung or flat hung arch. It operates on natural draft and is adapted to small and medium size boilers carrying a steady load.

The Harrington Stoker is of the forced draft traveling grate type. It burns a wide range of fuels including bituminous, anthracite, coke breeze and lignite.

Each of the stokers outlined is completely described in a separate catalog furnished upon application. Since no two plant conditions are alike it will be advantageous for the prospective purchaser to utilize the experience of our engineers who will gladly consult and co-operate in the selection and layout of stoker equipment.

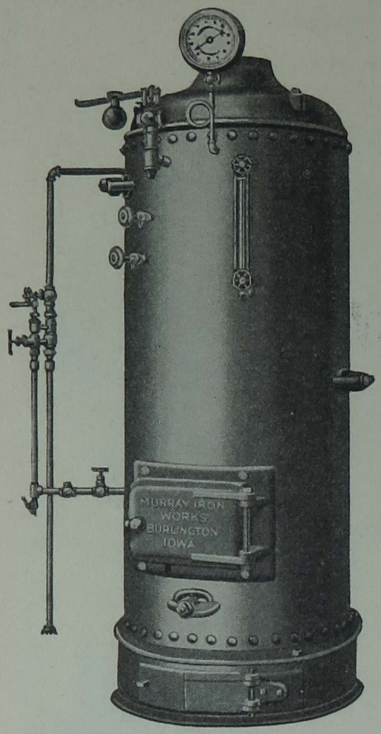
A Type for Every Stoker Need

Riley Super-Stoker
Riley Standard Stoker
Lateral Retort Stoker
Jones A-C Stoker
Jones Side Dump Stoker
Jones Standard Stoker
Industrial Furnace Stoker
Murphy Automatic Furnace
Harrington Traveling Grate Stoker

For all kinds of boilers from 50 horsepower up, as well as industrial furnaces, we have the type of combustion equipment to suit your requirements. We shall be glad to consult and co-operate with you in the solution of your combustion problems.

Special bulletins and prices upon application.

Murray Vertical Tubular Boilers



Made of high grade materials, with full length tubes. Furnished regularly for a safe working pressure of 100 pounds in accordance with the A.S.M.E. Code. Boiler can be furnished for any pressure above this. Made in sizes 2 to 80 h.p. Popular where space is limited. Sufficient handholes are provided for easy and thorough cleaning.

Every boiler is inspected during construction and is given hydrostatic test of 1½ times the authorized steam pressure, by a certified inspector. Boiler is ready for operation when shipped. Used in industrial plants and factories—in laundries, dairies, ice cream plants, etc.

Standard equipment: Base, base plate, ash pit door, grates, fire door and frame, smokehood, safety valve, steam gauge and syphon, gauge cocks, water gauge, blow-off valve, handhole plates with crabs, bolts and gaskets, injector and necessary piping, valves and small fittings for connecting injector to boiler.

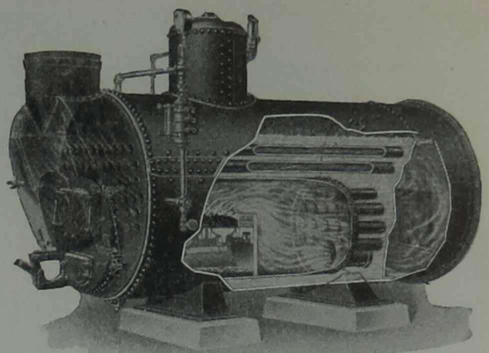
Sixty, 70 and 80 h.p. boilers are furnished with two injectors.

Specifications for 100 Lbs. Working Pressure, A.S.M.E.

H.P. Boiler	Boiler Inches		Firebox Inches		No. 2-In. Tubes	Length Tubes In.	Diam. Stack Req. In.	Size Steam Opening In.
	Diam.	Height	Diam.	Height				
2	20	42	16	18	19	24	8	¾
3	20	48	16	18	19	30	8	¾
4	24	48	20	23	24	25	8	¾
5	24	60	20	23	24	37	8	1
6	24	72	20	23	24	49	10	1
8	30	60	25	26	48	34	12	1¼
10	30	72	25	26	48	46	12	1½
12	30	84	25	26	48	58	12	1½
15	36	72	30	26	73	46	16	1½
20	36	96	30	28	73	68	16	2
25	42	87	36	27	98	60	18	2
30	42	93	36	27	98	66	18	2
35	42	105	36	27	98	78	18	2½
40	48	96	42	30	128	66	24	3
50	48	120	42	30	128	90	24	3
60	54	108	48	30	172	78	26	3
70	54	120	48	30	172	90	28	3
80	54	132	48	30	172	102	30	3

H.P. Boiler	Size Pop In.	Size Injector In.	Size Blow-Off Valve In.	Height Base In.	Height Hood In.	Overall Height Boiler In.	Total Weight Pounds
2	¾	½	¾	7	7½	56½	800
3	¾	½	¾	7	7½	62½	850
4	¾	½	1	7	9	64	1050
5	¾	½	1	7	9	76	1300
6	¾	½	1	7	9	88	1350
8	1	½	1	7	10	77	1700
10	1	½	1	7	10	89	1900
12	1	½	1	7	10	101	2100
15	1¼	¾	1	10	21	103	2500
20	1¼	¾	1	10	21	127	3400
25	1½	¾	1¼	12	21	120	3900
30	1½	¾	1¼	12	21	126	4100
35	2	1	1¼	12	21	138	4300
40	2	1	1¼	12	21	129	4650
50	2	1	1¼	12	21	153	5400
60	2–2	1¼	1½	12	24	144	7000
70	2–2	1¼	1½	12	24	156	7500
80	2–2	1¼	1½	12	24	168	8000

Murray Duplex Internally Fired Boilers



Boiler requires a minimum amount of coal per pound of water evaporated. All fire is inside the boiler, entirely surrounded by water, with no radiation outward through cracked walls and with no leaks of cool air inward. It has no brick walls to heat up and has the finest possible circulation of the water and hot gases combined with a liberal steam releasing space.

Freedom from danger of explosion. All its surfaces are cylindrical and therefore it requires no stay bolts or crown bars. The shell is not subjected to any external heat and can be made of the proper thickness to withstand any pressure.

The tubes are straight and the shell and furnace simple cylinders; repairs can be made as readily as on the simplest type of boiler, using the most ordinary tools.

The Murray Duplex Boiler is self-contained, requires no external brick work or expensive foundation.

Available in sizes 6 to 75 h.p. for 100 or 125 pounds pressure.

Specifications for 100 Lbs. Working Pressure

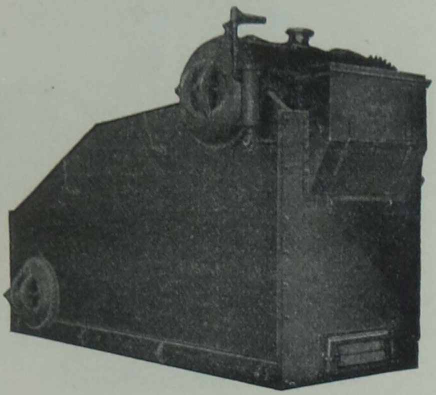
H.P.	Thickness of Steel Plate Inches			Return Tubes			Square Feet of Heating Surface
	Shell	Heads	Fire Box	No.	Diam. In.	Length In.	
6	¼	⅜	5/16	14	3	44	60
9	¼	⅜	⅜	14	3	68	90
12	5/16	⅜	⅜	17	3	72	105
15	5/16	7/16	⅜	18	3	72	132
20	5/16	½	7/16	25	3	78	180
25	5/16	½	7/16	25	3	96	220
30	5/16	½	½	32	3	96	256
35	5/16	½	½	32	3	114	312
40	⅜	½	½	43	3	96	345
45	⅜	½	5/16	46	3	96	370
55	⅜	½	5/16	46	3	120	459
60	⅜	½	5/16	60	3	132	600
75	⅜	½	5/16	73	3	138	745

H.P.	Dome Inches		Smoke Stack or Chimney Inches		Width Boiler Over All In.	Length Boiler Over All In.	Approx. Ship. Wt. on Skids with Reg. Fixt. Lbs.
	Diam.	Height	Diam.	Length			
6	18	18	11	20	36	71	3300
9	18	18	12	20	36	96	4000
12	18	18	12	20	38	100	4850
15	18	18	13	20	43	101	5500
20	18	18	15	30	45	113	6300
25	18	18	15	30	45	131	7200
30	22	22	18	30	48	134	8700
35	22	22	18	30	48	152	9200
40	22	22	20	30	55	138	10300
45	22	22	22	40	60	142	12500
55	22	22	24	40	60	168	14800
60	22	22	26	50	66	182	15500
75	22	22	26	60	72	188	18600

The above boilers can also be furnished for 125 pounds working pressure. Also available in 100 and 125-pound working pressure, A.S.M.E. construction.

Prices upon application.

Murray Two-Drum Low Pressure Water Tube Boilers



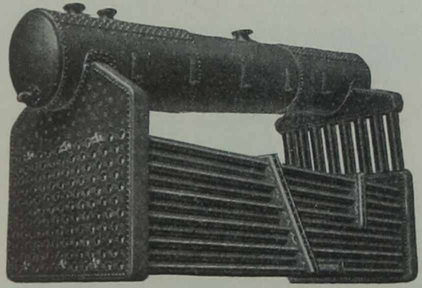
Boiler consists of an upper steam drum and a lower water drum connected by bent tubes and having side water walls. Lower tubes are exposed directly to the gases of combustion, setting up a rapid circulation of water in the boiler. The fire being entirely surrounded by water there can be no heat loss through the radiation of heat through brick walls. Use of flat plates over furnace and the flat tube sheet is avoided. Large furnace volume is provided to insure the most complete and efficient burning of fuel. For soft coal firing the boiler is furnished with a smokeless down draft type of furnace, rocking grates and baffling through the tubes designed for this type of fuel. Any waste material available may be used as fuel without fear of injury to the boiler or furnace.

A complete steel front with fire, ash and draft doors is provided and also a set of trimmings consisting of water column, water gauge, steam gauge, safety valve, blow-off valve and damper regulator. Built to comply with the rules and regulations of the A.S.M.E. code. Made in pressures up to and including 125 pounds.

Complete Information and Prices Furnished on Application.

Murray High Pressure Water-Tube Boilers

Type A



The type A boiler is an improved type of the straight tube, level drum construction designed for perfectly balanced circulation and a mechanical flexibility for carrying great overloads without stress or strain. Built with 1, 2 or 3 drums, depending upon h.p. required.

Cross-Drum Boiler

Constructed with box type headers giving ample steam and water space, and with large diameter cross drum connected to the headers by steam and water circulating tubes. The steam circulating tubes being exposed to the hot gases in the first pass have a superheating effect which insures dry steam under all load conditions.

Standard Boiler

Built with inclined or level drums and with box type steel headers front and rear.

4-Drum Vertical Bent-Tube Boiler

Consists of 3 upper steam and water drums and one lower water drum, all of which are connected by bent tubes acting as steam and water circulators.

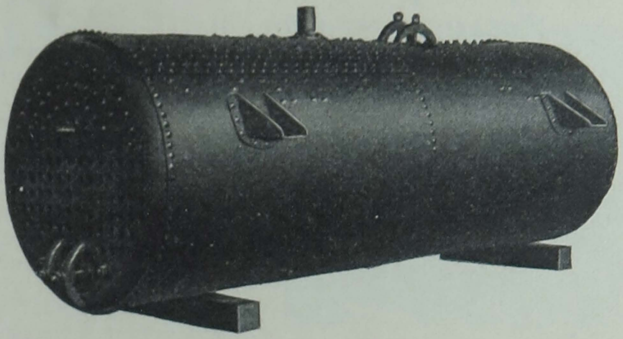
3-Drum Vertical Bent-Tube Boiler

Boiler is a modified type of the 4-drum boiler. Provides high velocity, unrestricted and positive water circulation, flexibility of operation and without expansion and contraction stresses at high ratings.

Complete Information and Prices Furnished on Application.

Horizontal Return Tubular Boilers

For 100 to 150 Pounds Steam Working Pressure



These boilers are built to comply fully with code of American Society of Mechanical Engineers.

The shell, heads and covering strips of the standard boiler are fire-box steel. They have the full specified thickness at the edges and have sufficient tensile, quenching and bending qualities.

The tubes are lap-welded mild steel of standard manufacture unless otherwise specified. The thickness of the metal is No. 12 B.W.G. for 3-inch tubes, No. 11 B.W.G. for 3½-inch tubes, and No. 10 B.W.G. for 4-inch tubes.

Boiler steel rivets of proper size are used to suit size of the hole and thickness of the plates and to form up heads equal in strength to the pressed heads of same.

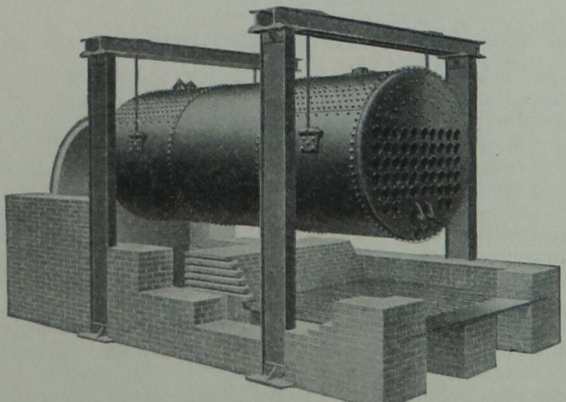
The longitudinal seam of the shell is of the butt joint type, having inside and outside covering strips and either double, triple or quadruple riveted. Suitable through rods and braces are installed below the tubes when necessary to sustain the pressure. These are of steel or iron and are computed with the same allowance as diagonal braces.

The tubes are placed in vertical and horizontal rows with ample space between tubes, and also between tubes and shell, for the circulation of water and also with a large steam space above the water line.

Boilers over 36 inches in diameter have feed opening in the front head over the tubes which are provided with a brass bushing and an internal feed pipe extending from the front end of the boiler to within about two-fifths of the rear head, and discharge about the central row of tubes.

The water column is provided with three gauge cocks so placed that the lowest visible portion of glass shall be four inches above the tops of the uppermost row of tubes. The middle gauge cocks are three inches and the uppermost gauge cock six inches above the lowest cock, measured vertically.

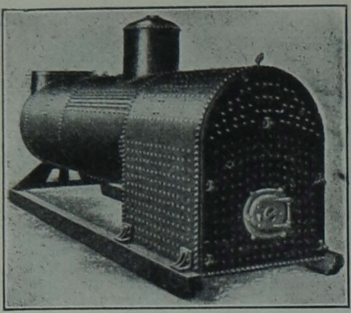
A complete standard boiler equipment includes: The bare boiler with lugs, steel or cast iron full or half front with dead plate and anchor bolts, grate bars with bearers, channels and buckstays for rear arch skewback, rear ash pit door and frame, safety valve with nipple to connect it to boiler, steam gauge with siphon, water column with gauge glass, three gauge cocks, stack plate with each full front boiler, blow-off valve, check valve for feed water line and stop valve for feed water line. Smoke stack, guys, damper, buckstays, wall plates and rollers, and dry pan or dry pipe are not standard equipment.



Single Setting with Full Suspension Rigging

Prices Upon Application

Murray Portable Locomotive Type Fire Box Boilers



Built to conform strictly to the latest requirements of the A.S.M.E. Code, and may be furnished for pressures up to and including 150 pounds safe working pressure.

Usual fittings and fixtures comprise the following: Grates of the rocking and dumping type; fire door and frame; fixed steam dome; support or front stand; extension on end with opening for the reception of smoke stack; smoke stack and guy wire; water column with water gauge; glass and gauge cocks; pop safety valves; blowoff valve; steam gauge and syphon; and necessary piping and small fittings for connecting water column to the boiler.

Boilers furnished completely mounted on skids as shown above.

Specifications for 100 Lbs. Working Pressure

H.P.	Diam. Boiler In.	Length Fire Box In.	Width Fire Box In.	No. 3 In. Tubes	Length Tubes In.	Thick. Shell In.	Thick. Fire Box In.
15	32	44	26	26	72	1/4	5/16
20	32	44	26	26	96	1/4	5/16
25	36	50	30	32	96	1/4	5/16
30	36	50	30	32	120	1/4	5/16
35	42	44	36	43	96	1/4	5/16
40	42	50	36	43	120	1/4	5/16
50	48	56	42	56	120	9/32	5/16
60	48	60	42	56	144	9/32	5/16
70	54	62	48	60	144	5/16	5/16
80	54	68	48	60	168	5/16	5/16
90	60	62	54	82	156	11/32	3/8
100	60	68	54	82	168	11/32	3/8

H.P.	Thick. Heads In.	Diam. Dome In.	Height Dome In.	Size Safety Valve In.	Size Blowoff Cock In.	Diam. Stack In.	Length Feet	Thick. Stack Gage No.
15	3/8	16	16	1 1/2	1 1/4	16	20	16
20	3/8	16	16	1 1/2	1 1/4	16	25	16
25	3/8	18	18	2	1 1/4	18	25	16
30	3/8	18	18	2 1/2	1 1/4	18	30	16
35	3/8	18	18	2 1/2	1 1/2	20	25	16
40	3/8	22	22	3	1 1/2	20	30	16
50	7/16	24	24	3	1 1/2	24	30	16
60	7/16	24	24	3 1/2	2	24	35	16
70	7/16	28	28	3 1/2	2	26	35	16
80	7/16	28	28	4	2	26	40	16
90	3/8	30	30	4	2	28	40	16
100	1/2	30	30	5	2	28	45	16

These boilers are also built with heavier shells and heads for any desired pressure.

Boiler Compound

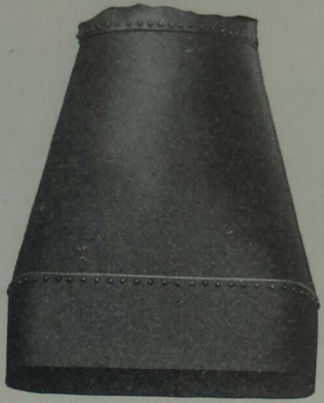
As the make-up water of most boiler feed waters requires individual attention and varies frequently, samples should be regularly submitted to a reliable chemist who can make the proper recommendations for treatment. Careful regulation of the sulphate-carbonate ratio will minimize danger of caustic embrittlement.

The following is a list of chemicals of which one or more are generally used:

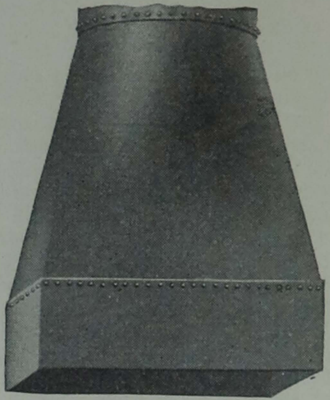
Aluminum sulphate, in bulk or 200-pound bags.
Di-sodium phosphate, in bulk or 300-pound barrels.
Hydrated lime, in 50-pound bags.
Mono-sodium phosphate, in bulk or 300-pound barrels.
Santosite, Anhydrous Sodium Sulphite, in bulk or 400-pound barrels.
Soda ash, in bulk or 150-pound bags.
Sodium aluminate, in bulk or 100-pound drums.
Sodium silicate, in bulk or 600-pound drums.
Sodium sulphate anhydrous, in bulk or 300-pound barrels.
Tri-sodium phosphate, in bulk or 300-pound barrels.

Smoke Stacks

Bases



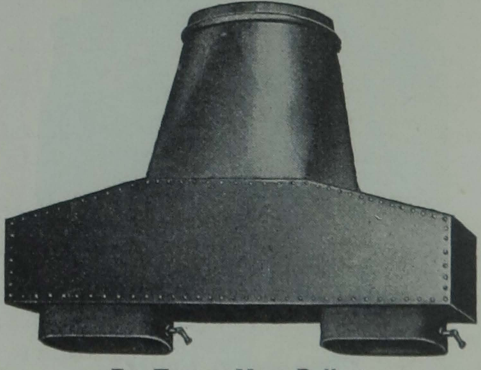
Oval Base



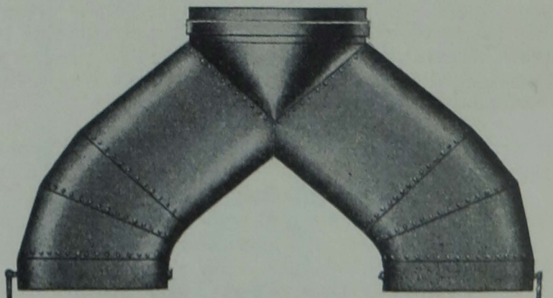
Square Base

When ordering smokestacks it is of utmost importance that the information concerning diameter of stack, gauge of steel and shape of base be clear and exact. Always state if bottom end of stack is round or oval, square or oblong and give outside dimensions of stack plate or saddle on boiler so that bottom of stack will be made of proper size to fit over same. Give diameter of boiler.

Smoke Connections



For Two or More Boilers

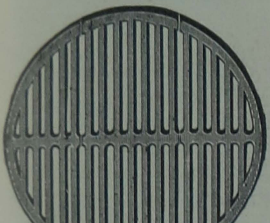


For Two Boilers Only

These smoke connections are strong and well made throughout and a damper is provided for the up-take from each boiler. Prices upon application.

Round Grates

For Upright Boilers

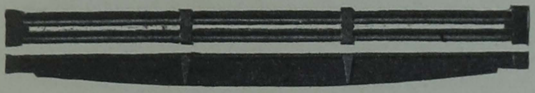


Diam. In.	Wt. Lbs.	Diam. In.	Wt. Lbs.	Diam. In.	Wt. Lbs.
In Two Parts					
16	45	**20**	75	**23**	87
18	50	**21**	78	**24**	97
19	57	**22**	85	**25**	100
In Three Parts					
26	120	**33**	180	**39**	350
27	122	**34**	185	**40**	385
28	125	**35**	210	**41**	390
29	145	**36**	220	**42**	400
30	150	**37**	225	**43**	410
32	175	**38**	345	**44**	435

Large sizes, 45 to 65-inch diameter can be furnished on short notice.

Prices upon application.

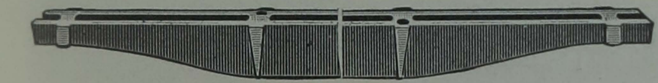
Straight Bar Grates



Length Inches	Width Inches	Air Space Inches	Weight Pounds
24	2¾	½	16
26	2¾	½	17
27	2¾	½	17
28	2¾	½	23
30	2¾	½	24
33	2¾	½	34
36	3	½	36

Prices upon application.

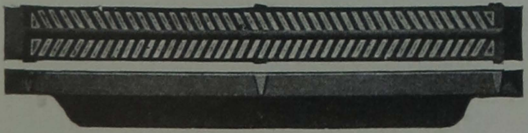
Heavy Pattern Common Grate Bars



Length Inches	Width Inches	Air Space Inches	Weight Pounds
42	3	⅝	56
48	3	⅝	60
50	3	⅝	60
54	3	⅝	70
60	3	⅝	90
66	3	⅝	105
72	3	⅝	115

Prices upon application.

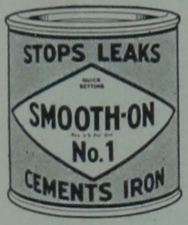
Herringbone Grate Bars



Length Inches	Width Inches	Thickness Metal Inches	Air Space Inches	Weight Pounds
33	6	½	½	65
36	6	½	½	75
42	6	½	½	85
48	6	½	½	100
54	6	½	½	115
60	6	½	½	130
66	6	½	½	145
72	6	½	⅝	160

Prices upon application.

Smooth-On Iron Cements



No. 1 is a quick-hardening iron cement used by mixing with water. For repairing breaks in castings, making tight joints and seams, and stopping leaks in boilers, pipe lines, pressure containers, etc. Becomes hard as iron when metallized, and expands at the same rate. May be used on iron, brass, steel, copper, lead, aluminum, etc., either alone or as a filling compound under a plate, and will withstand fire, water, steam, oil, and high pressures. In powder form.

No. 2 is a slow-hardening hydraulic iron cement for the same uses as No. 1. In powder form.

No. 3 is for making screw-thread joints, coating gaskets, and sealing rivets, seams and joints in boilers, etc. Lubricates in assembling screw threads. In paste form.

No. 4 is for filling surface defects in castings; No. 4-A for fine grained, No. 4-B for coarse-grained castings. In powder form.

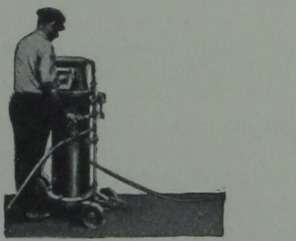
No. 5 is used by mixing with water. For caulking bell-and-spigot joints in cast iron soil, water, or gas pipes. Requires no heat. In powder form.

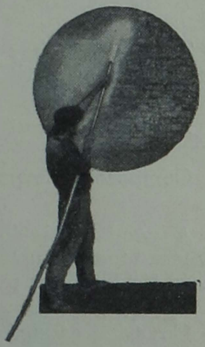
No. 6 is a dark gray plastic iron putty, sold ready for use for making water-tight joints on sky and vault lights, for filling in seams, rivet heads and for setting glass in metal frames, etc.

No. 7 is a hydraulic iron cement for waterproofing porous cellar walls from the inside, on wet or dry surfaces, and making hard dustproof and oilproof concrete floors. Especially useful for floors in garages, where oil is usually spilled and heavy tools allowed to drop. In powder form.

No.	1	2	3	4A	4B	5	6	7
7-Oz. Can.....each	$.30	...	...	...	...	...	...	....
1-Lb. Can...per lb.	.50	$.50	$.50	$.40	$.30	$.30	$.40	$.30
5-Lb. Can...per lb.	.40	.40	.40	.32	.24	.24	.32	.24
25-Lb. Keg...per lb.	.32½	.32½	.32½	.26	.19½	.19½	.26	.19½
100-Lb. Keg...per lb.	.27½	.27½	...	.22	.16½	.16½	..	.16½

Quigley Refractory Guns





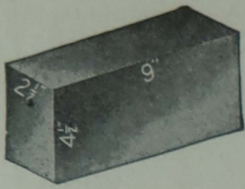
A special apparatus for application of refractory mixtures. Restores burned out furnace walls, fills cracks or holes, repairs leaky baffles and makes them air and gas tight. Its use for protective surfacing of new or old furnace brickwork with Q-Chromastic mixtures, adds materially to the service-life of the furnace lining. Because of the force of application, the mixtures will stick to hot or cold surfaces where troweled applications might fail to hold.

Gun is operated with compressed air, 80 to 90 lbs. pressure, with a volume of 120 to 140 cubic feet per minute. A special low pressure model is made to operate on 20 to 40 more pounds air pressure. Extension can be made out of iron pipe and attached to discharge nozzle, for long range work inside of furnace. Sandblasting rigging is available for high pressure model.

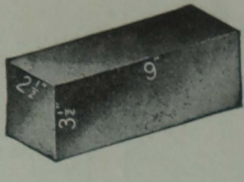
Gun is mounted on 3 wheels. Locking device anchors the gun when handle is erect. Capacity, 2 cubic feet of mixed refractory material. This charge will cover 100 square feet with a coat ¼-inch thick. Height from floor to top of cylinder, 3¾ feet. Complete as shipped includes all valves and cocks shown, safety valve and pressure gauges, and 20 feet of hose with nozzle and funnel for filling. Shipping weight crated, 600 pounds.

Each.................................... **$425.00**

Fire Brick—9-inch Shapes



9-Inch Straight
9x4½x2½ Inches



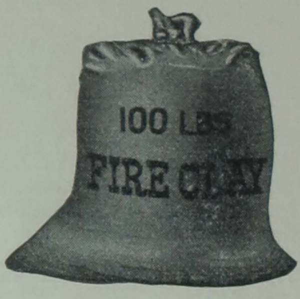
Small 9-Inch Brick
9x3½x2½ Inches

We can supply fire brick in any of the standard 9-inch shapes.

When ordering, give full description and sizes of bricks desired.

Prices upon application.

Fire Clay



Can be furnished in any quantity for use in metallurgical work or for any purpose or which fire clay is needed.

Prices upon application.

No. 500 J-M Insulating Cement

This cement has high covering capacity and heat resistance together with good working qualities.

It can be used at temperatures up to 1500 degrees.

Composed of expanded mica and asbestos fibre.

A good insulating cement useful for irregular surfaces where block insulation is not adaptable, but not ordinarily used for finishing purposes.

Covering capacity: 39 square feet, 1 inch thick, per container; 78 square feet, 1 inch thick, per 100 pounds.

Per Pound...................................... .....

Johns-Manville Fireite Asbestos Furnace Cement

JM
Johns-Manville
FIREITE
ASBESTOS FURNACE
CEMENT
Johns-Manville

A ready-mixed asbestos paste for cementing joints in furnaces, ranges, stoves, flue pipes, etc. It effectively prevents escape of smoke, gases and dust.

Fireite is conveniently plastic, readily workable, odorless and adheres firmly to castings and sheet metal. When subjected to heat, it vitrifies without shrinkage and forms a permanent, air-tight joint.

Johns-Manville Aertite Coating

JOHNS-MANVILLE
AERTITE
JOHNS-MANVILLE

Johns-Manville Aertite, a tough, rubbery asphaltic-asbestos coating in plastic form is used for waterproofing insulation on tanks, pipe line flanges and similar surfaces exposed to the weather.

Temperature limit, 250° F.

Applied over insulation in a thin trowled coat to approximately ⅛-inch thickness. Covering capacity depends somewhat upon the character of the surface. For a ⅛-inch coating it will take from 50 to 80 pounds per 100 square feet.

Aertite Coating is also used on outside of boiler walls to eliminate air-infiltration, preventing imperfect combustion due to air leakage through setting.

Furnished in 25, 50, 150, 300, and 500-pound containers.

Prices upon application.

J-M 85% Magnesia Cement

The 85% Magnesia cement is composed of approximately 85% carbonate of magnesia and 15% asbestos fibre. It is exceptionally light, and has a large covering capacity. It is recommended in cases where a cement of high insulating value is desired. Furnished in bags containing 60 pounds each, and has a covering capacity of approximately 35 square feet one inch thick, per bag.

J-M Insulating Cement

No. 352 Asbestos Cement

An inexpensive cement, for insulating heating boilers and pipe fittings.

Covering capacity 19 square feet, 1 inch thick, per bag.

Packed in 100-pound bags.

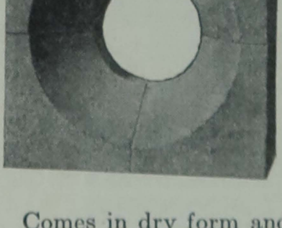
Prices upon application.

No. 400 Insulating Cement

A smooth-finishing cement of good insulating value.
Covering capacity, 25 square feet, 1 inch thick, per bag.
Packed in 100-pound bags.

Hearth-Crete

A Patented Chrome Base Castable Refractory



Hearth-Crete is a special refractory for monolithic hearths in steel heating furnaces, for making burner blocks which are spall proof and resistant to erosion. A quick repair material for tap holes and side walls in open hearth furnaces. Other uses include patching, and also building monolithic side wall sections, in copper reverberatory furnaces; casting burner blocks and other special shapes, etc.

Comes in dry form and is mixed with water on the job, like concrete, to a stiff plastic consistency. It is then put into place in the hearth, or into suitable forms, leveled off, and troweled smooth. No ramming. Sets quickly at room temperatures with great structural strength, and can be put under heat in 24 hours.

Ease of installation, improved operating results, longer life and economy are outstanding advantages. Has unusual load bearing strength, resists abrasion and wear, and is resistant to slag penetration.

Shipped in heavy, weatherproof burlap bags of 175 pounds net, sufficient for 1 cubic foot of finished construction.

Mono-Line Plastic Fire Brick

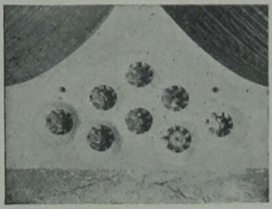
QUIGLEY
MONO-LINE
PLASTIC FIRE BRICK
QUIGLEY COMPANY

A first quality fire brick in plastic, easy working form. Used for building complete one-piece (monolithic) linings in small to medium sized boiler furnaces, forging and other furnaces where temperatures are above 2200° F. Frequently used in conjunction with fire brick—brick, laid with Hytempite, for wall construction—and Mono-Line for building monolithic bridge walls, front walls, door arches and jambs, and blow-off pipe deflecting piers in HRT boilers. This construction eliminates special shapes and intricate brickwork, and utilizes the inherent advantages of both types of construction.

Burned out or fallen sections of furnace walls and arches can be restored quickly and at low cost with Mono-Line. The repair frequently outlasts the original lining, as Mono-Line makes a solid unit replacement or patch. Strictly a quality plastic—highly refractory, and practically neutral as to expansion and contraction.

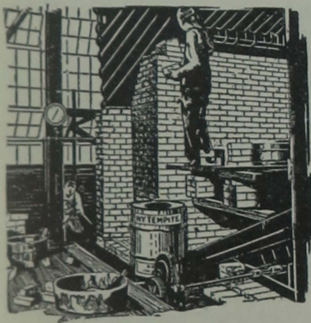
Shipped in 500-pound steel containers and in handy 100-pound cartons.

Prices and further information upon application.


Application of Mono-Line in front Wall of Oil-Fired Boiler Furnace

Hytempite

Plastic Air-Setting High Temperature Cement



Laying Fire Brick Furnace Wall with Hytempite

Hytempite is a scientifically compounded plastic refractory material for bonding fire brick and kindred uses. It forms a lasting union between the materials to be joined, air sets at normal room temperature and retains its strength up to temperatures at which the best quality fire brick loses strength and becomes soft.

Hytempite trowels easily, and insures a tight wall or structure which will not admit the passage of gases or any foreign substance such as dust, ashes, etc. It strengthens the wall, will withstand the action of expansion and contraction and can be put under heat while wet without injury. It withstands the cutting action of flames, and is recommended for oil furnaces where the gases are generally of high velocity.

Hytempite can be used wherever fire brick or tile are used; 225 to 350 pounds of Hytempite (or even less) will lay 1000 standard 9-inch fire brick—quantity will depend on uniformity and texture of the brick. When mixed with crushed old fire brick or Ganisand, Hytempite is used for making patches and repairs, monolithic baffles, special tile and shapes, etc.

Uses of Hytempite: For laying fire brick and tile; for tightening old walls and arches, sealing opening in new walls, stacks, etc. to make them airtight, lining doors, etc.; hot patching in furnaces, gas retorts, etc.; bonding new courses of a veneer of fire brick to old walls; preventing leaks between bricks and iron work; for lining ladles; for patching or building up tuyeres, etc.

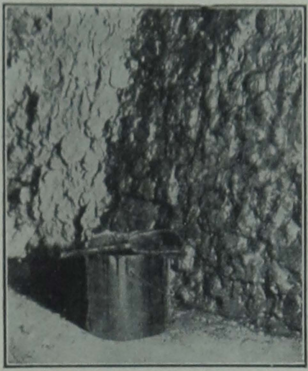
In steel drums of 100, 200, 500, and 800 pounds net.

Prices and further information upon application.

We are in position to supply many items not shown in this catalogue and shall be pleased to receive your inquiries.

Q-Chromastic

Plastic Super-Refractory Surfacing Mortar


Q-Chromastic Applied as a Broom Coat on an Eroded Furnace Wall

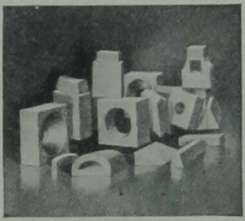
Q-Chromastic is used in the construction and maintenance of refractory structures. Through its use, as a wash or veneer coating over new or old furnace walls and arches, the life of brickwork is increased, repairs are reduced, and operating results affected.

Produces a strongly bonded, tough, dense and highly refractory veneer or facing, which acts as a rugged barrier between the brickwork and the flame, slags, gases, etc. Because of its neutral base, it prevents the destructive action of slag on the brickwork. The application of a coat on brickwork of oil-field furnaces gives what is known as a dry wall and the adhesion of fly ash caused by sticky walls is eliminated.

It adheres tenaciously to wall surfaces throughout the range of furnace temperatures. Resists slagging action, abrasion and flame erosion. Materially reduces spalling troubles. Fills and seals the pores and voids in the brickwork, makes linings air and gas tight. Prevents fluxing.

Furnished in 100 and 250-pound steel drums.

Cast-Refract

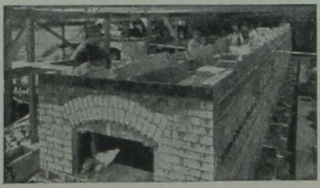

Shapes Made with Cast-Refract

This material is a castable refractory for monolithic furnace door linings, making special shapes etc. It sets quickly with great structural strength and can be put under heat in 24 hours or less. It is practically neutral as to expansion and contraction, and has excellent general refractory properties up to its temperature limit of 2600° F. Can be used also for building monolithic coke oven door and standpipe linings, steel soaking pit covers, oil refinery reaction chamber linings, etc. An important application is in the domestic oil burner industry for forming monolithic or pre-cast combustion chamber linings and for hearth construction.

Shipped dry in heavy burlap sacks of 125 pounds net, sufficient for 1.1 cubic feet of finished construction.

Q-Chrome

Neutral-Base Super-Refractory Cement



For severe service duty where extreme temperatures and destructive slagging, chemical or abrasive conditions are encountered.

For bonding brick in boiler furnaces burning hog fuel, high sulphur coal or oil, refinery acid sludge, etc.; also used in all types of oil, stoker and powdered coal fired furnaces operated at high ratings. This cement is used successfully in various steel and non-ferrous metallurgical furnaces because of its resistance to high temperatures, slagging and abrasive conditions.

This cement will not soften or crumble at the highest temperatures encountered in any fuel-fired furnace. It is virtually non-reactive, even at high temperatures. Stays in uniform suspension in the mortar box, an important advantage when laying long walls.

Shipped in heavy weatherproof bags of 175 pounds net.

Prices and further information upon application.

Johns-Manville Refractory Cements

J-M No. 31 Cement

Recommended for setting brick with bond or cushion joints. It makes an excellent joint of from 1/8 to 3/16 inch thickness where a heat-setting dry cement is desired. The brick is well protected and the wall is permanently bonded.

Mixed with water it develops exceptional plasticity and remains well in suspension in the mixing box. Aluminum silicate base; vitrifies at 1450° F. and can be used up to 3100° F. Packed in 100-lb. bags.

Where a wash-coat is used over a wall set with this cement, use J-M No. 32.

J-M No. 32 Cement

J-M No. 32, also heat-setting but finer grained than No. 31, is recommended for brick-to-brick joints and for wash-coating where a dry cement is desired. As a mortar J-M No. 32 has excellent plasticity, handles easily and stands well in suspension. Thinly mixed it is an excellent wash-coating for brickwork set either with J-M No. 31 or 32.

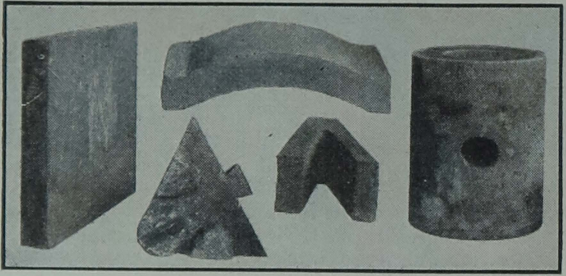
It fills in cracks and pores and materially retards deterioration. Aluminum silicate base, vitrifies at 1250° F. and useful up to 3100° F. Packed in 100-lb. bags.

J-M Hellite

Recommended for brick setting and wash-coating with a ready-mixed air setting cement, also for hot patching with paddle or gun. Has high adherence, minimum shrinkage, and will not bloat. Temperature limit, 3000° F.

J-M Firecrete

Three types, Standard and H.T. (High Temperature) and L.W. (Light Weight) a dry, hydraulic setting refractory cement used for monolithic construction. Handled like an ordinary concrete mixture. Especially suited for poured or cast special shapes, door and flue linings, furnace ducts, etc.



Some of the Special Shapes Easily Cast with J-M Firecrete

J-M Firecrete has exceptional spall resistance and it does not shrink as it dries. Temperature limit with H.T. Firecrete 2800° F., with Standard Firecrete 2400° F. and with L.W. Firecrete 2400° F. Furnished in 100-lb. bags.

J-M No. 20 Cement

An air-setting, ready-mixed cement for use with acid brick or where an extra hard air-set is desired. Used for brick-to-brick joints and for wash-coating. For temperatures up to 2700° F. Packed in various size containers from 5-lb. cans to 850-lb. drums.

J-M No. 26 Cement

A coarse, dry cement used for setting brick with a bond joint for temperatures up to 2900° F. Also recommended for cement gun applications. Takes a medium air-set. Packed in 100-lb. bags.

J-M No. 30 Cement

A coarse dry cement with a silicon carbide base used for setting silicon carbide brick. Also used as monolithic rammed linings in special oil-fired furnaces. Useful to 3000° F. Packed in 100-lb. bags.

J-M No. 33 Cement

A coarse, dry cement recommended particularly for patching Detroit Electric furnaces and for similar high temperature patching requirements. For temperatures up to 3300° F. Packed in 100-lb. bags.

J-M No. 34 Cement

A dry, chrome cement used principally for rammed linings in electric furnaces. For temperatures up to 3400° F. Packed in 100-lb. bags.

J-M No. 35 Cement

A dry, high alumina cement used for bond joints and for patching under unusually severe conditions. Temperature limit 3500° F. Packed in 100-lb. bags.

Quigley Triple-A Protective Coatings

Triple-A Protective Coatings are technical products made for the specific purpose of corrosion prevention, for use under conditions which quickly destroy ordinary paints.

Dry by evaporation, not oxidation, and therefore do not become porous or brittle.

No. 10 Triple-A Black

For Waterproofing and Preventing Corrosion of Industrial Structures

Used to protect and prevent corrosion of structural steelwork, towers, cranes, conveyors, tanks, steel sash, boiler fronts, breechings, stacks, etc.

This is a highly protective rust-preventive coating, resistant to acids, alkalies and moisture. It has remarkable penetrating properties and excellent heat resistance. It dries with a high gloss finish, and properly applied will neither chip nor peel. Can be applied on damp surfaces.

Shipped in 55, 30, 5 and 1 gallon steel containers.

No. 10 Triple-A Plastic

For Sealing Exterior of Boiler Walls, Roof and Tank Repairs, etc.

This is a special plastic material, applied like a plaster coating over the exterior of boiler and furnace walls to prevent infiltration of air and leakage of gases. Also used for caulking flashings of doors, windows, chimneys, etc.; for roof and tank repairs and other applications requiring an air-tight, waterproof, acid and alkali resisting seal. Will surface dry, but remains permanently flexible, and withstands temperature changes without cracking.

Shipped in 10, 50, 200, 350 and 500-pound steel containers.

No. 20 Triple-A Heavy-Duty Black

For Resisting Abrasion, Sulphurous Acid Fumes, Brine Moisture, Etc.

This is a heavy-duty coating; tough, abrasion and corrosion-resisting. Especially useful for coating the underside of structures subject to fly-ash and sulphurous fumes from smoke, coal hoppers, breechings and lower sections of stacks, submerged marine structures, etc.

Shipped in 5 and 1-gallon steel containers.

No. 44 Triple-A Bituminous Aluminum Vehicle

For Preventing Corrosion and Decorating Steel and Other Surfaces

Affords protection plus decorative finish of beauty and utility for steelwork, bridges, water towers and tanks, standpipes, fences, metal buildings, pipe lines, etc.

Mixed with aluminum powder (2 pounds per gallon). It combines the protective qualities of a black, waterproof, anti-corrosive base or undercoat, with the decorative and protective advantages of an aluminum surface. Primes, protects and decorates in one operation.

It is highly penetrative in action, resists heat, withstands temperature changes and properly applied will neither chip nor peel. Can be applied on damp surfaces. Highly resistant to the action of the elements, corrosive fumes, moist atmosphere, sun's rays and heat. Adapted for outside or inside use, and brush or spray applications. Shipped in 55, 30, 5 and 1-gallon steel containers (vehicle only).

No. 111 Triple-A Hydro Black

For Coating the Inside of Water Storage Tanks, Standpipes, Etc.

For protection of interior steelwork and equipment, inside of water tanks, and also steel work equipment in plants handling foodstuffs. Resists alkalies and is waterproof. Inert and odorless when dry. Will not impart either taste or odor to drinking water. Its high di-electric strength adapts it for use as an insulating varnish on switchboards and other electrical equipment.

Shipped in 55, 30, 5 and 1-gallon steel containers.

Prices and Further Information on Request

QUIGLEY **TRIPLE-A PROTECTIVE COATINGS**
Stocked only in Denver and El Paso
★
P & B **BLACK SPECIALTIES PAINT**
Stocked only in Salt Lake City

P & B Black Specialties

General Preservative Paints

Original product of The Paraffine Companies, Inc. used as a general preservative; acid resisting; good insulating paint for electrical work.

No. 1068 Paint Thinner

Nos. 151 Black, 152 Red, 153 Green, and 126 Brown Metal Paints

Combination bituminous and treated oil base paints for metal sash, roofs, pipes, machinery, and equipment where colors are desired. Recommended also for use on wood and concrete.

No. 58 Boiler and Stack Paint

For painting boilers and stacks.

No. 1041 Interior Boiler Paint

For use on the inside of steam boilers to prevent corrosion and permit the easy removal of scale.

No. 1024 Boiler Setting Compound

An adhesive plastic compound applied on the outside of brick work in which the boiler is set.

No. 1086 General Utility Paint

A coal tar paint suitable for painting metal or rough wood surface interior or exterior.

No. 1052 Utility Black

For inside or outside use on metal exposed to steam, gases, and severe weathering and wear. High resistance to corrosion.

Nos. 154 Fibre and 155 Plain Roof Coating

For recoating prepared roll roofing and galvanized iron roofs and for dampproofing masonry walls below and above ground level.

No. 156 Asphalt Plastic

A plastic compound containing asbestos fibre for caulking leaks in roofing, around flashings, skylights, gutters, brick and concrete walls, etc.

No. 164 Wet Surface Plastic

A coal type plastic of the same nature as No. 156 but capable of application to wet or damp surfaces such as in troughs, tanks, etc.

No. 180 Asphalt Emulsion

The standard type emulsion for waterproofing and dampproofing concrete and brick and for protecting rough wood and metal surfaces below ground level.

No. 9645 Black Gilsonite Paint

An inexpensive black shop coating material for castings, rude metal equipment and rough wood surfaces.

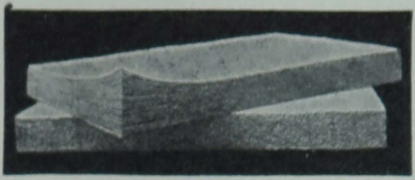
No. 9131 Asphalt Base Aluminum Paint

A general purpose, brilliant finish for every surface. Patented by the makers. Withstands heat in stacks and boiler fronts up to 600°F. Especially recommended for metal tanks, towers and equipment requiring a brilliant, decorative and durable finish.

Prices on above P & B Paints upon application.

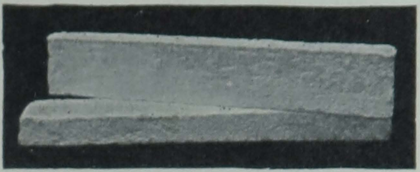
Johns-Manville Sheet and Block Insulation

Asbestos-Sponge Felted Sheets and Blocks



For surfaces where temperature does not exceed 700° F. Furnished in sheets 24x36 inches and blocks 6x36 inches, from ½ to 4 inches in thickness.

85% Magnesia Blocks



For surfaces where temperatures do not exceed 600° F. Blocks 3x18 and 3x36 inches, ½ to 4 inches thick.

Superex Blocks

The best and most adaptable insulating material where insulation must resist temperatures up to 1900° F.

Sizes 3x18 and 6x36 inches, in thicknesses 1 to 4 inches.

*Super Fire-Felt Sheets and Blocks

Especially adapted for use on heated surfaces at temperatures up to 1000° F. where relatively large sheets and a resilient material are desired. Standard blocks 6x36 inches and sheets 24x36 inches, from ½ to 4 inches thick.

**Pan-O-Cel Sheets

Type A—Suitable for temperatures up to 500° F. which includes drying rooms, enameling ovens, core ovens, etc. Type B—Waterproofed, for temperatures up to 250° F. Sheets 3x3 and 3x6 feet, from 1 to 4 inches thick.

Vitribestos Sheets and Blocks

For lining smokestacks, flues, etc., that will resist temperatures up to 700° F. Flat sheets 36x36 and 36x72 inches; curved sheets, 24x36 inches; thicknesses from ½ to 3 inches.

*Improved Asbestocel Sheets and Blocks

For medium or low pressure boilers, feed-water heaters, drying rooms, etc., where temperatures are not extreme. In standard sheets, coarse or fine corrugated, 36x36 inches; or blocks 6x36 inches, ½ to 4 inches thick.

*Asbestos Fire-Felt Sheets and Blocks

For conditions where a sheet form of insulation having considerable strength is desired. For temperatures up to 1000° F. Sizes 6x36 inches and 24x36 inches, ½ to 4 inches thick. For conditions where other insulations cannot be used, particularly as a first layer along with other insulations; for temperatures up to 1000° F.

Sizes 6x36 and 24x36 inches, ½ to 4 inches thick.

Weight Pounds, per Square Foot

Thickness In.	Asbestos-Sponge Felted	85% Magnesia	Superex	Fire-Felt	Pan-O-Cel	Super-Fire-Felt	Vitribestos	Improved Asbestocel 4-Ply to In.	Improved Asbestocel 6-Ply to In.
½	...	...	...	1.8	...	...	0.9	...	...
¾	...	...	...	2.6	...	...	1.3	...	...
1	3.5	1.4	2.0	3.3	2.5	1.7	1.8	1.0	1.3
1¼	...	...	...	4.0	...	...	2.2	...	...
1½	...	...	3.0	4.7	3.3	2.5	2.6	...	...
2	...	...	4.0	5.9	4.0	3.3	3.5	...	...
2½	...	...	5.0	7.1	4.6	4.2	4.4	...	...
3	...	...	6.0	8.1	5.1	5.0	5.3	...	...
3½	...	...	...	9.0	5.5	...	...	...	...
4	...	...	8.0	9.7	5.9	...	...	...	...

Prices, per Square Foot

Thick. In.	Per Sq. Ft.	Thick. In.	Per Sq. Ft.	Thick. In.	Per Sq. Ft.	Thick. In.	Per Sq. Ft.
†¼	$.22	1¼	$.38	2	$.60	2¾	$.83
‡½	.30	1⅜	.42	2⅛	.64	2⅞	.87
‡¾	.30	1½	.45	2¼	.68	3	.90
‡⅞	.30	1⅝	.49	2⅜	.72	3¼	.98
1	.30	1¾	.53	2½	.75	3½	1.05
1⅛	.34	1⅞	.57	2⅝	.79	4	1.20

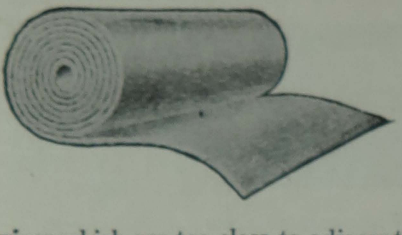
*Can be furnished in curved blocks or special sizes.

**Prices on Pan-O-Cel sheets upon application.

†Furnished only in Improved Asbestocel.

‡Exception: 85% Magnesia, ½, ¾ and ⅞ in. thick, 27 cents per sq. ft.; Improved Asbestocel, ¼ in., 22 cents per sq. ft., ½-in., 24 cents per sq. ft., ¾ in., 27 cents per sq. ft.

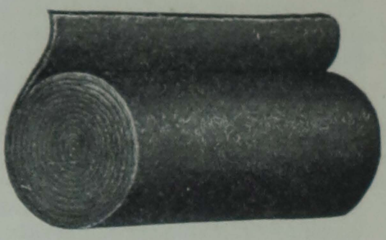
Asbestos Roll Fire-Felt



A soft, flexible felt of asbestos fibre, used where insulating and heat-resisting felt that may be folded, bent or wrapped around pipes and heated surfaces is desired. Especially adapted to wrapping around pipes which are too close to adjacent pipes to permit the use of sectional covering. Can be used as the first layer of insulation on high temperature surfaces. Furnished in rolls 3 feet wide containing approximately 100 square feet.

Size Inches	Price per Square Foot	Size Inches	Price, per Square Foot
3/32	$.16	1/4	$.30
1/8	.20	3/8	.50
3/16	.26	..	...

Hair Felt



Made of cattle hair, carefully selected and chemically cleaned.

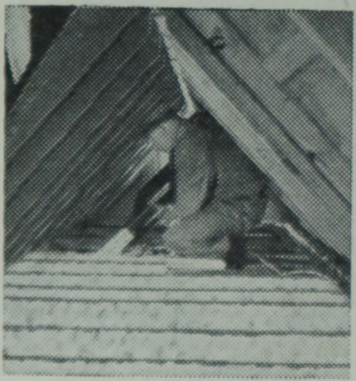
Used for refrigerator insulation and for insulating hot and cold water pipes.

Bales 6 feet wide contain 300 square feet; bales 3 feet wide, 150 square feet.

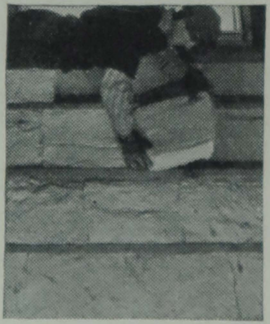
Extra charge for cutting less than 300 square feet.

Thick. In.	Per Sq. Ft.	Wt., Oz. per Sq. Ft.	Thick. In.	Per Sq. Ft.	Wt., Oz. per Sq. Ft.
1/4	$.08	4	1	$.16	12
1/2	.10	6	1½	.23	18
3/4	.13	9	2	.30	24

J-M Rock Wool



Pellet Type



Batt Type

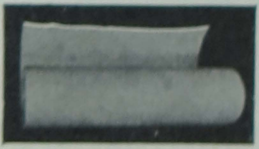
For scientific house insulation.

It is permanent and will not corrode, rot or disintegrate because it is made from rock. It is fire-proof, not just fire-resistant, for even a blow torch cannot burn it. It is unusually light in weight, odorless, clean, and easily handled.

Batts are factory made and can only be installed at uniform thickness and density for maximum effectiveness. They fit snugly between top floor joists or roof rafters and should also be installed in outer walls of new houses during construction. They completely fill all heat leaking spaces and cannot settle.

Prices upon application.

Asbestos Paper and Roll Board



	Paper		Roll Board	
*Thickness..in.	1/32	1/16	†3/32	†1/8
**Approx. Wt. 100 Sq. Ft....Lbs.	16	32	48	64

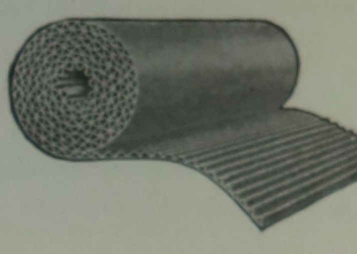
**Actual weight may vary ±10%.

*Actual thickness may vary ±.02".

†3/32" and 1/8" known as asbestos roll board.

Furnished in 100-lb. rolls.

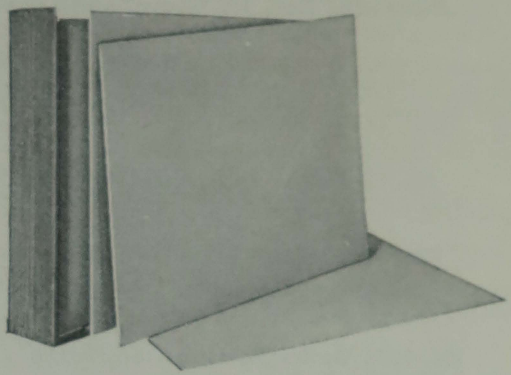
Corrugated Asbestos Paper



A flexible asbestos insulating paper for use on warm air pipes and ducts. The corrugations are approximately 1/4 inch deep. Furnished in rolls 36 to 37 inches wide, containing 250 square feet each. Weighs approximately 50 pounds per roll.

Price.................................per pound ....

Carey Asbestos Millboard



Carey Asbestos Sheet Millboard is produced from high grade asbestos fibre and is of special value for making fire screens, partitions and for protecting walls and ceilings, lining furnaces, stoves and grates and an indefinite number of purposes requiring heat and fire protection.

Carey Sheet Millboard is manufactured in the following standard grades:

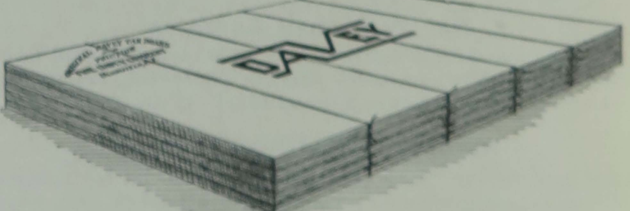
No. 1 Grade is a hard compact board, due to closely matted fibre. No. 7 is a board of medium consistency.

Special grades to meet special requirements can be furnished. No orders for a special grade of less than 2000 pounds accepted.

Unless otherwise specified all asbestos millboard will be furnished in standard size sheets 40x48 inches.

Thickness In.	Per Lb.	Wt. Lbs. Per Sheet Size 40"x48"	Wt. Lbs. Per Sheet Size 42"x48"	Wt. Oz. per Sq. Foot	Thickness In.	Per Lb.	Wt. Lbs. Per Sheet Size 40"x48"	Wt. Lbs. Per Sheet Size 42"x48"	Wt. Oz. per Sq. Foot
1/32	....	2.4	2.5	2.9	3/16	....	12.6	13.3	15.2
3/64	....	3.3	3.5	4.0	1/4	....	16.7	17.6	20.1
1/16	....	4.4	4.6	5.3	5/16	....	20.2	21.4	24.4
5/64	....	5.7	6.0	6.9	3/8	....	23.9	25.2	28.8
3/32	....	6.7	6.0	8.0	1/2	....	29.9	31.5	36.0
1/8	....	8.5	9.0	10.3	5/8	....	40.7	42.9	49.0
5/32	....	10.7	11.3	12.9	3/4	....	44.3	46.6	53.3

Friction Board



No.	4	5	7	14
Thickness.....in.	1/4	3/16	1/8	1/16
Size Boards.....in.	34x44	34x44	34x44	34x44
No. of Boards to Bundle	4	5	7	14
Approx. Weight per Bundle lbs.	50-60	50-60	50	50

Intermediate numbers between 4 and 16 supplied on order.

Prices upon application.

Sectional Pipe Insulations Approximate Weights

Weights Given Are Pounds per Standard 3-foot Section

Asbesto-Sponge

Thickness	Pipe Sizes, Inches								
	½	¾	1	1¼	1½	2	2½	3	3½
Std.	4.35	4.70	5.26	6.00	6.42	7.38	8.31	9.52	10.60
1½ in.	8.95	9.50	10.40	11.40	12.00	13.30	14.70	16.50	17.90
2 in.	13.00	13.60	14.80	16.20	17.00	18.80	20.70	23.10	25.20
3 "	25.40	26.50	28.20	29.70	31.60	34.30	37.20	41.00	43.80

Thickness	Pipe Sizes, Inches								
	4	4½	5	6	7	8	9	10	12
Std.	11.60	12.50	13.80	15.70	17.70	19.70	21.70	23.80	27.80
1½ in.	19.40	20.80	22.70	25.60	28.30	31.00	34.00	37.20	43.00
2 in.	27.10	29.00	31.50	35.20	39.10	43.00	47.50	51.30	50.20
3 in.	46.70	49.70	53.70	59.30	65.20	70.80	76.80	83.50	95.50

85 per cent Magnesia

Thickness	Pipe Sizes, Inches								
	½	¾	1	1¼	1½	2	2½	3	3½
Std.	1.62	1.85	2.02	2.39	2.74	3.77	4.30	5.00	5.57
1½ in.	3.77	4.12	4.59	5.10	5.52	6.27	7.16	8.10	8.88
2 in.	6.11	6.75	7.30	7.89	8.40	9.42	10.60	11.90	12.90
Dbl.Std.	4.86	5.31	5.80	6.42	7.23	9.82	10.90	12.30	13.40
3 in.	12.40	13.20	14.00	15.20	16.00	17.40	19.10	21.10	22.60
2½ in.	8.95	9.80	10.50	11.25	11.90	13.20	14.50	16.10	17.40

Thickness	Pipe Sizes, Inches								
	4	4½	5	6	7	8	9	10	12
Std.	6.83	7.42	8.05	9.35	11.90	13.20	14.50	16.10	23.00
1½ in.	9.70	10.50	11.40	13.10	14.70	16.30	18.00	19.80	23.00
2 in.	14.00	15.20	16.40	18.60	20.80	23.00	25.10	27.50	31.60
Dbl. Std.	16.40	17.60	19.00	21.50	27.30	29.90	32.60	35.70	50.70
3 in.	24.20	25.90	27.70	31.10	34.40	37.50	40.70	44.30	50.70
2½ in.	18.80	20.00	21.55	24.50	27.30	29.90	32.60	35.70	40.90

Fire-Felt

Thickness	Pipe Sizes, Inches								
	½	¾	1	1¼	1½	2	2½	3	3½
Std.	4.80	5.06	5.35	6.00	6.40	7.08	7.88	8.80	9.53
1½ in.	9.70	10.10	10.60	11.40	12.00	12.90	14.00	15.40	16.40
2 in.	13.00	13.60	14.30	15.60	16.40	17.80	19.30	21.30	22.80
3 in.	23.00	23.80	24.90	27.00	28.20	30.40	32.80	35.90	38.40

Thickness	Pipe Sizes, Inches								
	4	4½	5	6	7	8	9	10	12
Std.	10.30	11.10	12.00	13.60	15.20	16.80	18.20	19.90	23.00
1½ in.	17.50	18.50	19.80	22.00	24.20	26.30	28.40	30.70	35.00
2 in.	24.40	26.00	27.80	31.10	34.30	37.50	40.70	44.20	50.60
3 in.	40.80	43.40	46.10	51.30	56.20	61.00	66.10	71.40	81.40

Pre-Shrunk Asbestocel

Thickness	Pipe Sizes, Inches								
	½	¾	1	1¼	1½	2	2½	3	3½
2 ply	.90	1.04	1.18	1.37	1.49	1.74	2.02	2.37	2.64
3 "	1.27	1.42	1.60	1.86	2.01	2.37	2.71	3.15	3.50
4 "	2.00	2.19	2.40	2.69	2.90	3.30	3.74	4.25	4.67
5 "	2.46	2.67	2.90	3.21	3.44	3.90	4.35	4.95	5.40
6 "	3.10	3.32	3.60	4.00	4.30	4.83	5.40	6.10	6.65

Thickness	Pipe Sizes, Inches								
	4	4½	5	6	7	8	9	10	12
2 ply	2.92	3.19	3.48	4.05	4.60	5.14	5.68	6.26	7.34
3 "	3.87	4.20	4.60	5.37	6.04	6.75	7.47	8.25	9.65
4 "	5.09	5.54	6.00	6.98	7.72	8.56	9.41	10.35	12.00
5 "	5.87	6.33	6.85	7.87	8.80	9.75	10.67	11.70	13.60
6 "	7.20	7.75	8.38	9.60	10.70	11.80	13.00	14.20	16.45

Anti-Sweat

Thickness	Pipe Sizes, Inches								
	½	¾	1	1¼	1½	2	2½	3	3½
¾ in.	3.35	3.70	4.07	4.60	4.98	5.70	6.55	7.50	8.30
1 "	4.10	4.50	5.00	5.60	6.10	7.00	7.93	9.12	10.07
1½ "	7.90	8.40	9.07	9.95	10.58	11.80	13.10	14.70	16.00

Thickness	Pipe Sizes, Inches								
	4	4½	5	6	7	8	9	10	12
¾ in.	9.10	9.87	10.75	12.47	14.00	15.60	17.25	19.00	22.15
1 "	11.00	11.95	13.00	15.05	16.93	18.85	20.70	22.80	26.60
1½ "	17.30	18.60	20.00	22.80	25.27	27.95	30.60	33.40	38.60

Wool Felt

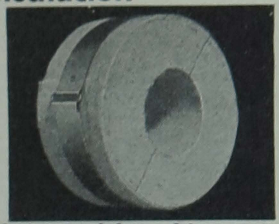
Thickness	Pipe Sizes, Inches									
	½	¾	1	1¼	1½	2	2½	3	3½	4
½ in.	1.40	1.60	1.82	2.08	2.28	2.70	3.15	3.60	4.00	4.50
¾ "	2.35	2.60	2.90	3.23	3.50	4.10	4.70	5.30	5.90	6.50
1 "	3.10	3.63	4.20	4.75	5.30	6.40	7.50	8.54	9.63	10.70

Zero

Thickness	Pipe Sizes, Inches				
	½	¾	1	1¼	1½
Std.	4.00H	4.43L	4.88H	5.30	5.72

Thickness	Pipe Sizes, Inches				
	2	2½	3	3½	4
Std.	6.67	7.60	8.50	9.40	10.30

J-M Asbesto-Sponge Felted Sectional Pipe Insulation

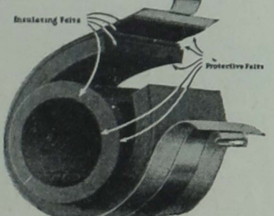


A durable, adaptable and efficient insulation for pipes conveying steam or fluids at temperatures to 700° F. Made of layers of thin felt, composed of asbestos fibre and particles of finely ground spongy material forming an extremely cellular felt, built up like a book in laminated form thereby confining a large volume of minute dead air cells in the felt and between the layers. Tough, flexible and practically indestructible. It is suited to withstand vibration and wear and tear encountered in modern steam engineering practice.

Furnished in thickness from 1 inch to 3 inches, in 3-foot sections with canvas jacket and brass-lacquered bands to fit standard pipe sizes. Also furnished in sheets and blocks for boilers, flues, and large regular surfaces.

Sold from regular sectional pipe insulation list prices.

J-M Anti-Sweat Sectional Pipe Insulation



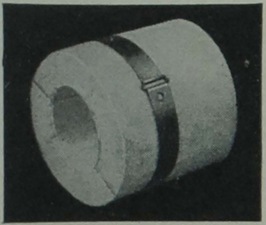
For insulating pipes conveying cold water or other cold liquids at temperatures above 32 degrees Fahrenheit. A combination of insulating felts that keep heat away from the pipe, and waterproofed felts that protect the insulating felts against the admission of moisture.

Anti-sweat insulation prevents condensation of moisture and dripping from pipes and keeps the contents of the pipes cool.

Furnished in thicknesses of ½-inch and ¾-inch solid construction, and in 1-inch, 1½-inch and 2-inch broken joint construction, in 3-foot sections, to fit standard pipe sizes. Not furnished in sheet or block form.

Sold from regular sectional pipe insulating list prices.

J-M 85% Magnesia Sectional Pipe Insulation

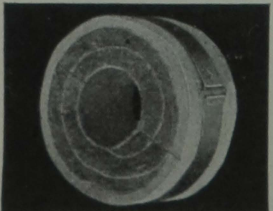


For pipes conveying steam. This insulation combines the high insulating qualities of carbonate of magnesia and asbestos and affords a light, efficient insulation. Under actual service conditions, 85% Magnesia has proven to be the most durable and efficient insulating material of the molded type.

Made in various thicknesses from standard (approximately 1 inch thick) to 3 inches, in 3-foot sections with canvas jacket and brass-lacquered bands, to fit standard pipe sizes up to and including 10 inches diameter. For larger sizes, curved segments or blocks are supplied. Also furnished in blocks for covering boilers, boiler flues, and other large regular and irregular surfaces.

Sold from regular sectional pipe insulation list prices.

J-M Zero Sectional Pipe Insulation



For insulating cold water pipes located where there is likelihood of the water in the pipes freezing, but where temperatures are moderate rather than extreme or where the length of time that the surrounding air would be below freezing-point is short. Constructed of layers of 1-inch hair felt surrounded by several layers of wool felt and with a layer of saturated wool felt inside the hair felt. Hair felt, one of the best non-conductors, greatly retards the flow of heat from the pipe.

Furnished in one thickness only, approximately 1¼-inch, in 3-foot sections with canvas jacket and brass-lacquered bands, to fit standard pipe sizes. Not furnished in sheet or block form.

Sold from regular sectional pipe insulation list prices.

J-M Sectional Pipe Insulation

Price, per Linear Foot

These pipe insulations are supplied in sections three feet long, canvased and with brass lacquered bands.

Asbesto-Sponge Felted Insulation is made in thicknesses from 1 inch to 3 inches.

85 per cent Magnesia is made in Standard (approximately 1-inch), 1½-inch, 2-inch, Double Standard 2½-inch, and 3-inch (broken joint) thicknesses.

Pre-shrunk Asbestocel Insulation is made in 2 to 8-ply thicknesses; for all these thicknesses, use list prices for standard thickness.

Zero Insulation is made in one thickness only, approximately 1¼ inches. Use standard thickness list prices.

Anti-Sweat Insulation is made in ½, ¾, 1, 1½ and 2-inch thicknesses. Use standard thickness list prices for thicknesses 1-inch and under.

Inside Diameter of Pipe Inches	Price, per Linear Foot					
	Thickness					
	Standard	1½-inch	2-inch	†Double Standard	2½-inch	3-inch Broken Joint
½	$.22	$.46	$.75	$.65	$1.00	$1.20
¾	.24	.49	.80	.70	1.05	1.35
1	.27	.52	.85	.75	1.10	1.40
1¼	.30	.56	.90	.80	1.15	1.45
1½	.33	.60	.95	.85	1.20	1.55
2	.36	.64	1.00	.90	1.25	1.65
2½	.40	.70	1.05	1.00	1.35	1.75
3	.45	.76	1.15	1.10	1.50	1.90
3½	.50	.82	1.25	1.20	1.65	2.05
4	.60	.88	1.35	1.40	1.80	2.20
4½	.65	.94	1.45	1.50	1.95	2.35
5	.70	1.00	1.55	1.60	2.10	2.50
6	.80	1.10	1.70	1.80	2.25	2.70
7	1.00	1.20	1.85	2.25	2.40	2.90
8	1.10	1.35	2.00	2.50	2.55	3.15
9	1.20	1.50	2.20	2.70	2.80	3.40
10	1.30	1.65	2.40	2.90	3.05	3.65
*12	1.85	1.85	2.70	4.10	3.40	4.10
14 O. D.	2.10	2.10	3.00	4.60	3.80	4.60
16 O. D.	2.35	2.35	3.30	5.10	4.20	5.10
18 O. D.	2.60	2.60	3.60	5.60	4.60	5.60
20 O. D.	2.85	2.85	4.00	6.00	5.00	6.00
24 O. D.	3.30	3.30	4.50	7.00	5.75	7.00
30 O. D.	4.00	4.00	5.50	6.95	8.40	8.40

*Sizes 12-inch and larger furnished in segmental form. 12-inch can be supplied in sectional type on special order. This applies to 85% Magnesia and Superex.

†Only 85 per cent Magnesia made in this thickness.

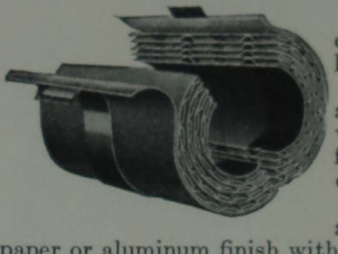
J-M Wool Felt Sectional Pipe Insulation

For Hot or Cold Water Service

Made of special indented wool felt by a new process which increases efficiency and reduces weight; new dual-service liner. Furnished in two finishes: Regular canvas, and a smooth dull-coated aluminum. Sections 3 feet long in thicknesses of ½, ¾, 1-inch, double ½ and double ¾-inch. Regular sectional pipe insulation list.

J-M Pre-Shrunk Asbestocel Sectional Pipe Insulation

Canvas Finish and Bands
Asbestos Finish and Bands
Aluminum Finish and Bands



Cellular insulation for pipes carrying low pressure steam or hot water.

Made of moisture-resisting asbestos paper which prevents moisture absorption from the air and subsequent objectionable shrinkage.

In addition to canvas, it is also furnished with asbestos paper or aluminum finish with black japanned bands.

Furnished in 3-foot sections in thicknesses of 2, 3 and 4 plies, each ply approximately ¼ inch thick.

Pipe Insulation Data

Proper Thickness of Covering for Maximum Net Saving

How to Use These Tables

Determine your cost of coal, steam pressure and size of pipes; select the table where the coal cost most nearly corresponds to your coal cost. Then select the column where the steam pressure most nearly corresponds to your steam pressure. The thicknesses in this column are the proper thicknesses for the pipe sizes given at the left of the table.

Example: Cost of coal $3.75, steam pressure 150 pounds, size of pipe 12 inches. Select the $4.00 per ton table and the third column headed "Steam at 100–200 Pounds." Run down this column to the 12-inch pipe size line and find the proper thickness to be DS (3½ inches).

Coal at $2.00 per Ton

Size Pipe In.	Hot Water 175° F.	Steam 5 Lbs.	Steam 100-200 Lbs.	200 Lb. 150° F. Super-heat	200 Lb. 300° F. Super-Heat
¾	S	S	S	1½″	DS
1½	S	S	S	1½	DS
3	S	S	S	1½″	DS
6	S	S	1½″	2″	DS
12	S	S	1½″	2″	DS
24	S	S	2″	3″	DS
Flat	1	1½″	2″	3″	3½″

Coal at $4.00 per Ton

Size Pipe In.	Hot Water 175° F.	Steam 5 Lbs.	Steam 100-200 Lbs.	200 Lb. 150° F. Super-heat	200 Lb. 300° F. Super-Heat
¾	S	S	1½″	DS	2″
1½	S	S	1½″	DS	2″
3	S	S	DS	DS	3″
6	S	1½″	DS	3″	3″
12	S	1½″	DS	3½″	4″
24	S	1½″	DS	3½″	4″
Flat	1½″	2″	3″	4″	5″

Coal at $6.00 per Ton

Size Pipe In.	Hot Water 175° F.	Steam 5 Lbs.	Steam 100-200 Lbs.	200 Lb. 150° F. Super-heat	200 Lb. 300° F. Super-Heat
¾	S	S	DS	2″	2″
1½	S	1½″	DS	2″	3″
3	S	1½″	DS	3″	3″
6	1½″	2″	DS	3″	4″
12	1½″	2″	DS	4″	4″
24	1½″	2″	DS	4″	5″
Flat	2″	3″	4″	5″	6″

S means standard thickness.

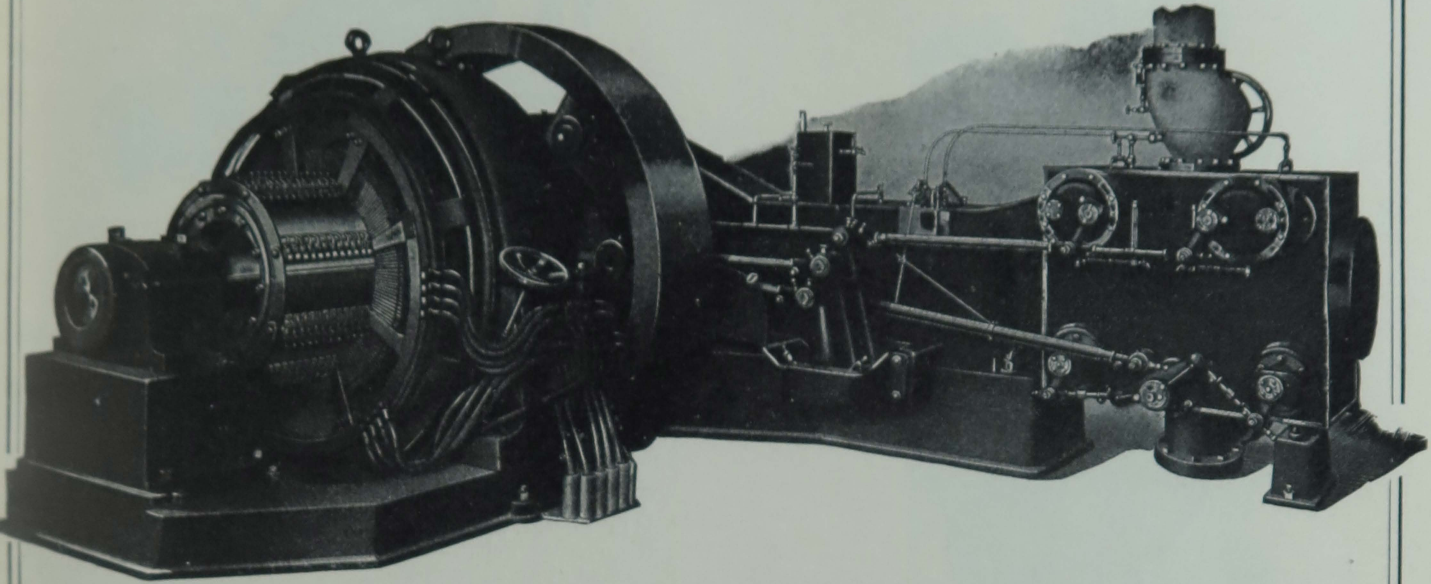
DS means double standard thickness.

Protection of Pipes Against Freezing

To determine the amount of insulation necessary for the protection of pipes from freezing, the rate of flow, the location, the outside temperature and the nature and temperature of the liquid for which protection is desired must be known.

Send us your inquiry, giving the above information, for the amount of insulation required.

ERIE BALL ENGINES



Erie Ball Non-releasing Valve Corliss Engine

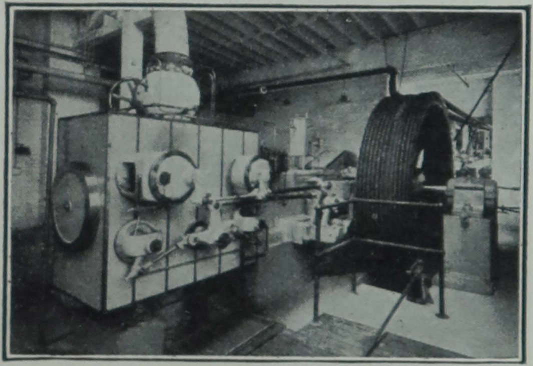
Where economy together with reliability and perfect speed regulation is required, the Erie Ball Non-releasing Valve Corliss Engine cannot be equalled, and justifies us in claiming it as the American Standard today.

These engines are built in sizes ranging from 100 to 800 horsepower in the Single Cylinder Type and up to 1600 horsepower in the Compound Type.

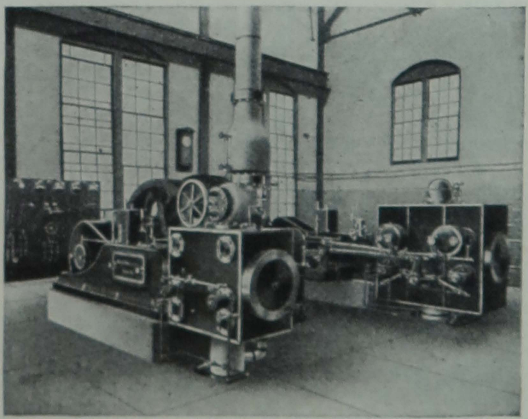
All advantages of modern machine shop facilities have brought this engine to its high state of refinement. However, the present engine is substantially in accordance with the original design, a remarkable testimonial to its soundness, and the purchaser is absolutely assured of a thoroughly tried machine, lacking entirely in experimental features.

For all industries.

Complete information on request.

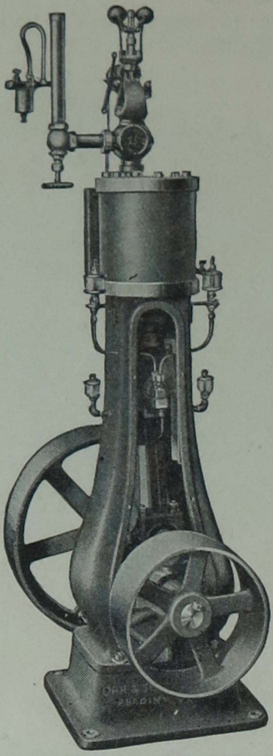


Erie Ball Single Cylinder Corliss Engine for rope or belt drive



Erie Ball Compound Engine direct connected to generator

O. & S. Improved Class F Center Crank Vertical Engines



This engine is well made throughout, the rods being of steel, the crank shaft of solid forged steel, balanced, and the brasses of phosphor-bronze.

A steam test is made before engine leaves the factory, and the necessary adjustments carefully made, so that the engine is ready to run the moment it is placed in position and given steam.

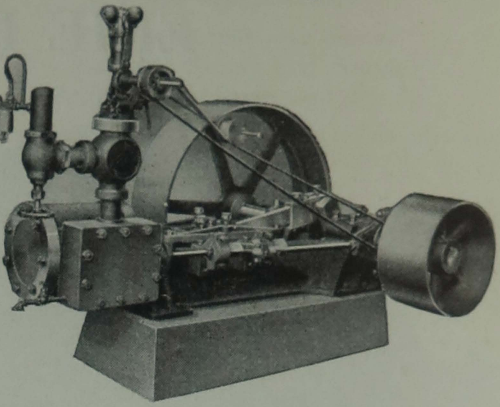
The fittings and fixtures comprise: Fly-wheel, pulley, oil cup, sight feed lubricator, throttle valve and nipples, governor and governor belt, foundation bolts and washers will be furnished when ordered at an extra price.

H.P.	5	7	9
Cylinder . . . in.	4½x5½	5¼x7½	6¼x7½
R.P.M.	300	250	225
Diam. Steam Pipe . . . in.	¾	1	1¼
Diam. Exhaust Pipe . . . in.	1	1¼	1½
Diam. Shaft . . . in.	1 11/16	2⅜	2⅜
Diam. and Face of Wheel . . . in.	20x5	24x6	24x6
Diam. and Face of Pulley . . . in.	12x6	14x6⅝	14x6⅝
Ht. from Floor to Center of Shaft . . . in.	10⅜	13⅝	13⅝
Ht. from Floor to Top of Cylinder . . . in.	43	54	54
Floor Space . . . sq. in.	17	20	20
Ship. Wt. . . . lbs.	550	900	925

H.P.	11	14	. . . .
Cylinder . . . in.	7½x7½	7½x9	. . . .
R.P.M.	200	200	. . . .
Diam. Steam Pipe . . . in.	1½	2	. . . .
Diam. Exhaust Pipe . . . in.	2	2½	. . . .
Diam. Shaft . . . in.	2⅝	2 13/16	. . . .
Diam. and Face of Wheel . . . in.	28x7	30x7	. . . .
Diam. and Face of Pulley . . . in.	16x7½	16x7½	. . . .
Ht. from Floor to Center of Shaft . . . in.	17¼	17¼	. . . .
Ht. from Floor to Top of Cylinder . . . in.	63	67	. . . .
Floor Space . . . sq. in.	24	24	. . . .
Ship. Wt. . . . lbs.	1400	1600	. . . .

Prices and further information upon application.

O. & S. Class L Center Crank Horizontal Engines



Suitable for all kinds of work where high speed and smooth running are required. Crank shaft is cut from solid forging and is equipped with counterbalancing weights. Main bearings of crank shaft are made large and strong. Connecting rod has extra heavy phosphor-bronze boxes at each end. Solid-end type crosshead end; strap type crankpin end. Both brasses are adjusted by means of wedges.

The fittings comprise: fly wheel, pulley, grease cups, sight-feed lubricator, throttle valve and nipples, automatic governor and governor belt. Foundation bolts and washers can be furnished at an extra cost.

H. P.	Size Cyl. In.	Rev. per Min.	Steam Pipe In.	Exhaust Pipe In.	Fly Wheel In.	Pulley In.	Diam. Shaft In.	Length Journals In.	Wt. Lbs.
15	7½x 9	225	1½	2	40x10½	20x10	2 13/16	6	1700
20	8½x10	225	2	2½	44x10½	20x10	2 15/16	7	2100
25	9½x10	225	2	2½	48x12½	24x12	3¼	8	2800
30	10 x12	200	2½	3	52x12½	24x12	3¾	8½	3300
40	11 x14	180	3	3½	60x14½	30x14	4	10	4700

Prices upon application.

WE CAN SERVICE

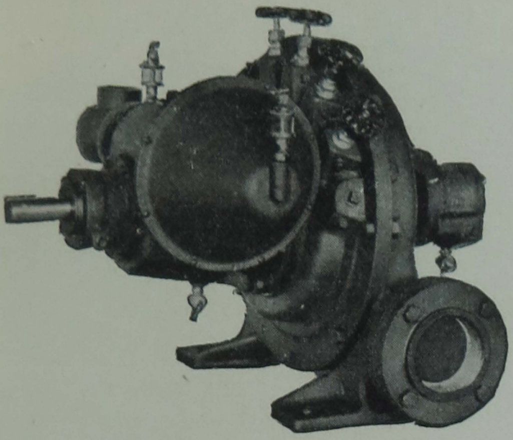
YOUR WELDING EQUIPMENT

SEND

YOUR REGULATORS AND TORCHES

FOR REPAIR

Type TF Coppus Steam Turbines



Coppus Steam Turbines, Type TF, can be applied in sizes ranging from fractional to 150 h.p.

There are two ball bearings; the one next to the shaft extension is of the double row deep groove type; the other end of the shaft is supported by a double row self-aligning ball bearing. They are mounted in separate bearing housings, which are connected to the turbine housing by separate bearing yokes. The bearing yoke on the turbine cover side contains the worm gear housing of the governor drive.

The turbine shaft is of large diameter and short span. Designed to have the critical speed in excess of the highest operating speed. The shaft extension is key-seated to receive flexible coupling, pulley or sprocket.

The buckets or blades are cast into the high tensile bronze turbine wheel. This process is such that the buckets themselves are held in perfect alignment in a machined jig during the shrinking of the metal. The turbine wheel is of the two-row velocity stage impulse type with stationary sector between the two rows of buckets. The steam, after having passed through the first row of blades, is reversed by the buckets of the stationary sector and directed into the second row.

The standard direction of rotation is clock-wise when facing the turbine from the shaft extension. Counter-clockwise direction of rotation can be provided upon request without additional cost.

The two interchangeable stuffing boxes are equipped with metallic packing rings molded in conical shape.

For steam turbines exhausting to vacuum or for gas turbines, steam-sealed or water-sealed stuffing boxes are provided.

Standard brass oil gages, the same as used on electric motors, maintain the proper oil levels for the two ball bearings and the worm gear drive of the governor. Sight feed oil cups provide lubrication for the governor spindle. In addition, an effective splash system insures lubrication of all running governor parts under all conditions.

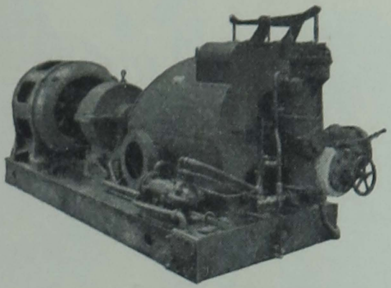
Coppus Steam Turbines, Type TF, are equipped with constant speed, fly-ball or fly-weight type, centrifugal governors. The governor head is driven directly from the turbine shaft through a worm and gear, the former being mounted on the turbine shaft, the latter on the governor head. Operating speed may be adjusted while the turbine is running. The worm gear set and governor head are fully enclosed.

If required, the Coppus Steam Turbine can be equipped with an excess speed safety trip consisting of a centrifugal device on the turbine shaft, a lever operated pilot valve and a quick shut-off valve in the live steam line.

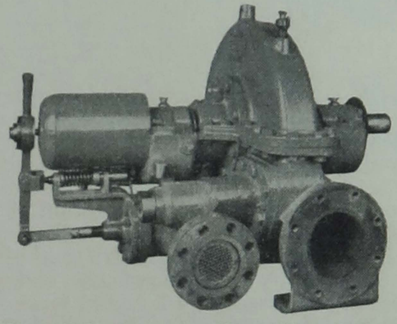
Coppus Steam Turbines, Type TF, are built in six sizes, 9, 12, 16, 20, 22-2½ and 22-3 inches, with a rating from fractional to 150 h.p., which latter rating represents, with most other makes, the smallest unit. This allows to choose, for instance, a 5 h.p. steam turbine for a 5 h.p. job instead of a much larger unit. The result is low price, small floor space and balanced appearance of driving and driven units.

Prices upon application.

Westinghouse Small Turbine Generator Units



Type M Geared Turbine Generator



Type C Turbine for Mechanical Drives

The Type C line of turbines comprises the latest features conducive to high efficiency and reliability, and is particularly adapted for driving pumps, forced and induced draft fans, compressors, pulverizers, lineshafts, and similar apparatus; either direct connected, through gear or belt drive. Steam turbines for mechanical drives have many important advantages in industrial, central station, and marine applications. They may be used for supplying by-product power at low cost acting as reducing valves between boilers and various process pressure requirements. They serve in the same capacity where building heating, water heating, and related loads are high. They may be used to advantage in regulating plant heat balance where the steam and electrical demands have dissimilar characteristics. They provide a dependent source of power supply, and are inherently free from danger of fire, making them ideal for certain applications in oil refineries, chemical plants, etc.

Operating costs are low because of the small amount of mechanical attendance required which can satisfactorily be given by unskilled labor. Oil does not reach the interior of the turbine with the result that the exhaust steam is clean and suitable for uses where this is essential. The use of turbines permits a speed selection over a wide range to suit the characteristics of driven apparatus, either direct connected or for use in combination with reduction gears.

Main speed governor of the mechanical, shaft type. Single, governor controlled, main steam inlet valve. Overspeed trip device. Oil ring lubrication. Steam strainer. Sentinel valve mounted in turbine casing.

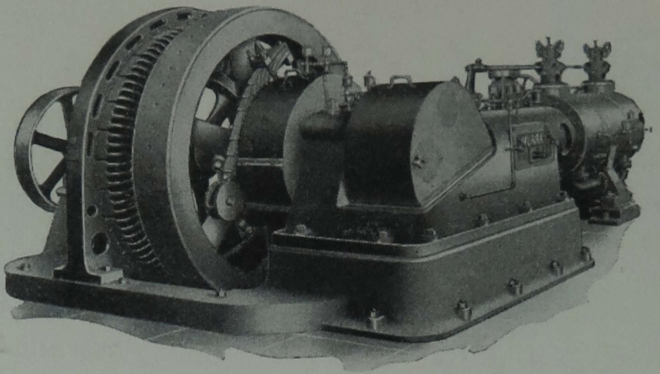
The turbines are of the impulse type having 1 pressure and 2 velocity stages. They are built in capacities ranging approximately from 5 to 500 h.p., at turbine speeds of 1000 to 5000 r.p.m. Suitable for use with steam pressures up to 650 pounds gauge and for total temperatures up to 750° F. They may be operated either condensing or non-condensing with rotation in either direction.

Each turbine is shipped as a complete unit with supporting feet ready for bolting to the foundation or to the driven apparatus base plate.

Prices upon application

Murray Una-Flow Engines

100 to 2500 H.P.



The Una-Flow Engine is especially adapted to higher speeds and steam temperatures and shows greater economy at full and fractional loads. This economy is due to the steam jacketed cylinder heads, central exhaust ports, earlier cutoff and resultant greater number of expansions of the steam. The flow of steam in one direction only, due to the central exhaust ports, and the steam jacketed heads, keep the ends of the cylinder hot and the center at comparatively lower temperature, thus eliminating a large portion of the usual losses due to interchange of heat between the steam and metal and the consequent condensation and re-evaporation of steam in the cylinder.

The cylinder and heads are cast in dry sand of close grained durable iron (attained by a careful selection and mixture of the most suitable brands) especially adapted for work under the high temperature of superheat. The cylinder, designed to withstand a safe working pressure of 175 pounds after two reborings, has central exhaust openings and end flanges for attaching the heads. The lower portion of the exhaust chamber forms the support. Both cylinder and heads are covered with 85% non-conductive covering and lagged with planished steel.

The cylinder heads are properly annealed to eliminate shrinkage strains and thoroughly sand blasted inside to insure the removal of core sand and scale, and so constructed as to be steam jacketed and designed to avoid all water pockets. The inlet and auxiliary exhaust valves and steam inlet nozzles are in the cylinder heads.

The main bearing is provided with removable journals made up of a bottom and two side shells, lined with babbitt metal hammered to a proper density, bored and accurately scraped to a true bearing surface and grooved for distributing oil. Bearing has horizontal wedge and screw adjustment. Bottom box is tongued and grooved into frame and quarter boxes are doweled to bottom box to prevent side play. Quarter boxes are made extra high to eliminate the necessity of a top box, thereby air cooling the bearing.

The frame is enclosed extra heavy duty type, designed for maximum strength and rigidity, with broad bearing surface to rest on foundation. Base of frame extends full length of casting and an oil pan is furnished under the connecting rod and crank, cast integrally with the frame. The bottom edge of frame has a bead forming an oil retaining rim. The guides are bored type, which guarantee perfect alignment. There is a false head placed at the end of the guide with metallic packing to fit piston rod, to prevent oil splashing against the hot cylinder head. The rocker arm bracket on top of frame is bored and bushed with a ground semi-steel bushing, giving freedom from wear and extra long life to the bearing.

Outer bearing is two-piece type, babbitted and mounted on a pedestal. Provision is made for adjusting shaft horizontally and vertically and for taking up bearing to compensate for wear. A large oil reservoir catches the surplus oil which is drained back into gravity system. Hand hole in cap permits determination of bearing temperature.

The crank is arm type, with the necessary counter balance cast integrally. Crank is properly machined, pressed on shaft by a hydraulic press capable of exerting a pressure of 250 tons, and keyed.

Crank pin is of open hearth steel with bearing hardened and ground and pressed into crank under hydraulic pressure and riveted over.

The squaring of the shaft with center line of engine can be checked at any time by setting the crank on dead center. The distance between crank and small planed pads on frame at each end, if equal, assures perfect alignment.

The governor is of the Rites combined inertia and centrifugal type, well balanced, simple in construction, and responds quickly to any variation in load. Owing to the use of but one spring, adjustment is quickly and easily made. Carried in cast iron case enclosed in planished steel oil guard.

Cast iron piston is of strong but light construction, insuring a minimum of wear and friction, and has three concentric packing rings at each end. Piston is of proper length to uncover central exhaust ports at each end of stroke. Piston rod is of hammered open hearth steel double annealed, turned and ground, pressed into the piston and securely locked in place with an extra heavy nut. Metallic packing is provided in cylinder head stuffing box. Piston rings are rough turned, split, and ground to fit cylinder bore, to prevent any possible leakage.

Connecting rod is solid end type forged from quality steel without welds and fitted with adjustable boxes. Crank pin box is semi-steel babbitted and crosshead box of solid bronze both with compensating wedge adjustment on same side of pins so as to maintain a uniform length of rod.

The crosshead is of cast steel of strength and large wearing surface. It has cast iron shoes, both top and bottom, which are babbitted, accurately machined and scraped to fit the guides and grooved for oil distribution. The shoes are adjustable by means of shims. Crosshead pin is flange type, eliminating the usual crosshead pin nut, and is of open hearth steel with bearing hardened and ground and has tapered fit into the crosshead.

The inlet valves located in cylinder heads are double seat poppet type with flexible upper seat, both seats carefully ground in place to insure tightness. Valves are fitted with grooved stems operating in long guides forming labyrinth packing which eliminates the use of fibrous or other types of packing. Stems are connected to valves by solid heads and lock nuts and at the top are threaded into small circular crossheads which carry the cams. Adjustment between roller and cam is quickly and easily made at this point.

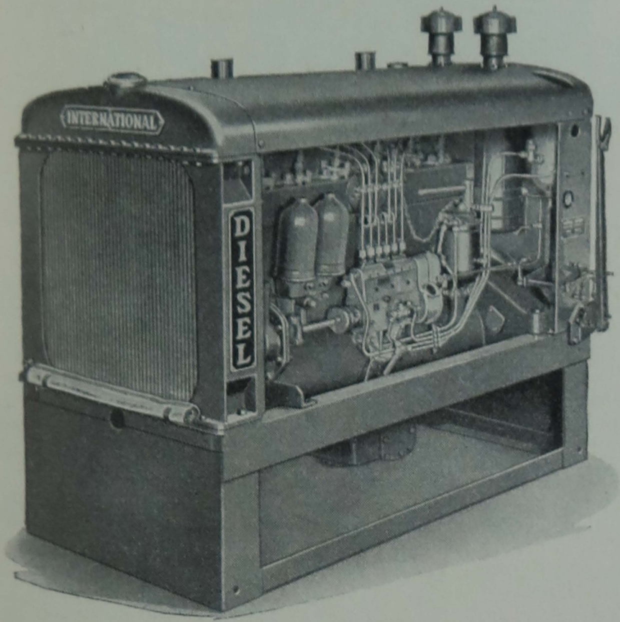
The auxiliary exhaust valves are of the piston type, fitted with concentric packing rings operating in cages which are pressed into the cylinder heads. They are steam-balanced and noiseless in operation and are operated by an eccentric, through a rocker arm and valve rods. The position of the eccentric on the shaft may be changed to regulate the compression to meet the operating conditions regarding back pressure. Slight adjustments are made by varying the length of the valve rods.

The valve gear is of the improved simplex type, driven by an eccentric controlled by the shaft governor, through a rocker arm and a single valve rod, connected through a flexible joint to plungers carried in bored guides. The plungers are fitted with rollers which engage the inlet valve cams to open the valves. Valves are closed by coil springs. Travel of the plungers is varied by the governor to suit the load. Equal distribution of steam is easily secured by adjustment of the single valve rod under running conditions.

Made in sizes from 100 to 2500 h.p.

Prices Upon Application

Model PD-80 International 6-Cylinder Diesel Power Units



Internationals are the only Diesels that can be cranked by hand under all weather conditions as readily as gasoline engines of corresponding sizes.

The essential parts—cylinders, pistons, crankshaft, manifolding, and cooling and lubricating systems—are common to both starting and Diesel operation. International Diesels are converted into gasoline engines by 1 simple operation. This operation automatically engages the magneto, increases the combustion chamber, incorporating the spark plugs, and opens a valve in the manifold connecting with the carburetor. After a minute or so of gasoline operation, a quarter turn of a small crank reduces compression chamber to size for Diesel operation, shuts off gasoline, and starts Diesel fuel injection, enabling engine to operate on a small quantity of low-priced fuel without the use of a carburetor, magneto or spark plugs.

The 7-bearing crankshaft is of special chrome-molybdenum steel, drop-forged and electrically heat-treated. The crankshaft is Tocco hardened, new electrical heat-treating process which provides file hard bearing surfaces yet retains ductile characteristic through the rest of the crankshaft. The 7 main and connecting rod bearings are steel-backed and copper-lead lined. Connecting rods are drop-forged I-sections with bearings 2 inches wide. Crankshaft bearings are lubricated through drilled passages in the crankshaft and piston pin bearings through drilled passages in connecting rods. Pistons are of aluminum alloy and have a silchrome insert at top to dissipate heat. Cylinders are of special alloy material and are heat-treated and replaceable.

Equipped with fuel injection pump; fuel supply pump; closely regulated, fly-ball type governor; fuel filters; full pressure lubrication with gear-driven oil pump and double capacity metal oil filter with oil pressure regulating valve; International carburetor and high-tension magneto; exhaust pipes; and mounting angles.

Special equipment includes electric starter; and for irrigation pumping, an automatic shut-off for the cooling water, a front hood sheet used in place of the radiator, and an oil filter with a shut-off.

Maximum h.p., corrected to sea level barometric pressure and 60 degrees F., power unit fully equipped, 100; h.p., continuous load, 80. Bore and stroke, 4¾x6½ inches; r.p.m., 1400. Clutch diameter, 15 inches; clutch torque, 785 pounds-feet. Flywheel housing, S.A.E. No. 1.

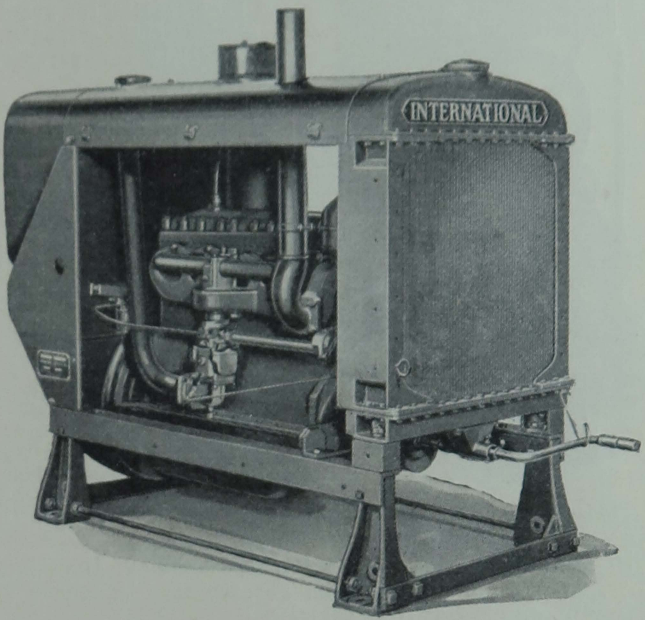
Has 1-gallon tank for starting fuel and 1-gallon intermediate tank with fuel strainer and supply pump.

Over-all length, 98¼ inches; over-all width, 41 inches; over-all height on welded steel base, 66¼ inches.

Approximate weight, fully equipped, including welded steel base, 3750 pounds.

Prices and other sizes upon application.

Model PA-50 International 6-Cylinder Gasoline Power Units



Operates an air compressor with maximum displacement of 300 cubic feet per minute when operating against 80 pounds gauge pressure; operates a 2-stand, 80-saw cotton gin; furnishes sufficient power for flour mill with capacity of 95 barrels in 24 hours; operates 35-kilowatt generator; operates a 2-cylinder, single-acting compressor with 7½-inch bore and stroke, at speed of 325 r.p.m., sufficient for 30 standard tons of refrigeration per 24 hours; operates rock crusher that has 15x36-inch jaw opening and 200 r.p.m., at a rate of 20 to 28 tons an hour crushed to 1½-inch size; operates sawmill with capacity of 7000 to 14000 board feet of lumber in 10 hours; enables pump with 25-foot dynamic head to deliver 4200 gallons of water a minute.

Has a full pressure lubrication system, including main connecting-rod, piston pin, camshaft, and rocker-arm bearings. Pressure is supplied by a gear type oil pump and all oil is carefully filtered before being circulated in the engine.

Cylinders are cast individually of close-grained gray iron; machined on the outside and inside, honed and polished on the inside, and then assembled in the engine. Exhaust-valve seat inserts are replaceable and valves have removable guides.

The 7-bearing crankshaft is drop-forged of alloy steel and heat-treated to give required strength and hardness and then the bearings are Tocco hardened.

Pistons and connecting rods are accurately balanced in sets before assembly on crankshaft. A centrifugal pump, thermostatically controlled, regulates water in cooling system. A high-tension magneto with automatic impulse starter provides positive spark at all times. Air is cleaned by an oil air cleaner; fuel is strained, and oil filtered.

Regularly equipped with oil filter, carburetor, S.A.E. No. 2 bell housing, angle sills, high-tension magneto, and either a 1000, 1400, 1800 or 2200 r.p.m. governor.

Maximum horsepower, fully equipped at sea level, 60 degrees F., at high governed r.p.m., 66.5; horsepower, continuous load, 53.2. Bore, 3¾ inches; stroke, 4½ inches. Low governed r.p.m., 1400; high governed r.p.m., 1800. Clutch diameter, 14 inches; clutch torque, 722 pounds-feet.

Has gasoline tank of 29-gallon capacity.

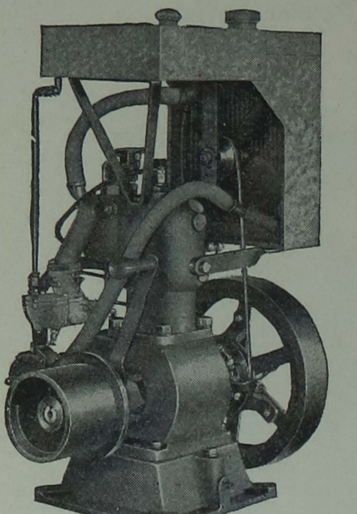
*Over-all length, 72¼ inches; over-all width, 33⅜ inches; over-all height, 54¾ inches.

Approximate weight, including cast iron leg base, 2055 pounds.

*Over-all dimensions include cast iron leg base.

Prices and other sizes upon application.

Cushman Engines



Model C-34, The Radiator Unit with Clutch

Crankshaft is chrome nickel steel, drop forged and heat treated for great toughness and strength. Alloy steel does not crystallize.

The main bearings are taper roller. These bearings eliminate friction and wear. Do not loosen and knock, burn or pound out. Oil leakage is eliminated by felt washers and retainers. Large capacity oil pump. Plunger type oil pump circulates oil to crank case. Overflow in crank case maintains constant and exact oil level. Partition in crank case on the E-35 two-cylinder engine holds even level for both connecting rods. Dippers on rods splash oil to pistons, bearings and gears, and force oil into the rod bearings.

High tension magneto with impulse coupling, gives fat, hot spark at all speeds, even at cranking. Magneto is driven by a spur gear from camshaft.

Automobile type, high efficiency carburetor, controlled by throttling governor. Engine can be operated on gasoline, kerosene, distillate, tractor fuel or natural gas.

Water is circulated about the cylinders by a large capacity, gear driven centrifugal pump. Engines are furnished with either radiator or tank cooling, or any available water supply can be used.

The throttling governor controls the amount of gas required for each explosion to maintain an even speed. The weighted crankshaft counterbalances the crank throw, connecting rod and piston. Extra heavy machined flywheel rim.

Chrome nickel alloy cast pistons and cylinders. Piston rings, 3/16 in. wide; 3 compression above piston pin and 1 oil ring below the piston pin.

Normal speed, 1150 r.p.m. *Clutch or pulleys optional.

Model C-34, 5-6 H. P. Vertical Engines

Engine will be equipped with a cone clutch if desired. On special order, various sizes of V-belt drives can be had on the cone, and grooves can be put in the flywheel. Will pull large potato diggers or the heaviest binders.

The cylinder is made in one piece. No gasket leaks. Valves are completely water jacketed.

Diam. of crankshaft extension, 1¼ in.; mechanically operated valves. One piece cylinder. No gasket leaks. Base dimen., 12½x12½ in. Overall dimen., with tank, 23x27½x48 in.; with radiator, 19x31½x24½ in.; engine only, 16½x23x21 in.

Model E35, 10-12 H. P. Twin Cylinder Engines

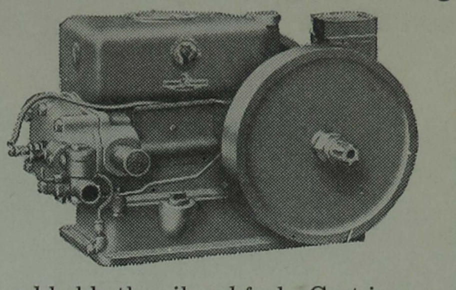
L head type cylinder. All cylinder walls completely surrounded by extra long water jacket. Removable head. Valves 1⅜ in. diameter. Valve stems and push rods completely enclosed and lubricated. Can be had with outboard bearing, for heavy duty belt work.

Specifications

Model		C-34	E-35
Each		**$150.00**	**$245.00**
Bore and Stroke	in.	4x4	4x4
Piston Displacement	cu. in.	50.26	100.5
Speed	r.p.m.	400–1400	500–1400
H.P.		5 to 6	10 to 12
Connecting Rod Bearings	in.	1⅜x1⅞	1⅜x1⅞
Piston Pin, Diam	in.	1	1
Water Capacity, Tank Equipped	gal.	11	43
Water Capacity, Radiator Type	gal.	1¼	3
Fuel Capacity, Tank Equipped	gal.	3	10
Fuel Capacity, Radiator Type	gal.	2	6
Oil Capacity	qts.	1¾	2
Clutch Pulley, Diam	in.	6	7
Clutch Pulley, Face	in.	4	6
Flywheel	in.	14x2½	14x4
Weight, Engine Only	lbs.	185	296
Shipping Weight, with Tank	lbs.	305	465
Shipping Weight, with Radiator	lbs.	270	393

*Clutch net, 42 pounds.

Cushman Cub Engines



For the farm, small machine shop and the odd job man. Also power for light plants, pumps, sprayers, compressors, etc.

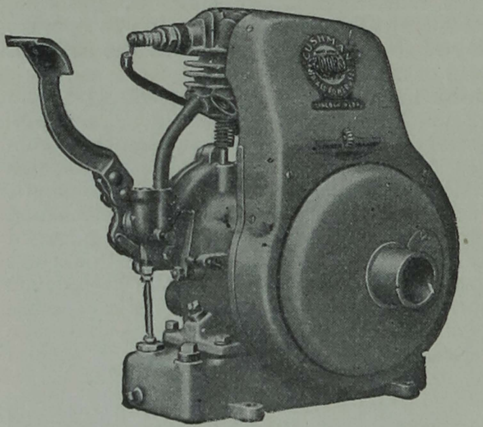
The one-piece case base adds to the rigidity of the cylinder casting and holds the oil and fuel. Cast iron gas tank.

Oil capacity, 1 quart; sufficient for 30 hours running.

The cylinder is of special alloy cast iron, containing nickel, chromium and steel. The cylinder, hopper and crank case are all cast in one rigid block. This cylinder is supported its full length, by the heavy one-piece cast iron base. Cylinder heads are the high compression type. The pistons are made of special alloy castings. The crankshaft is drop-forged from special steel; heat treated. Two heavy, opposed flyballs on the crankshaft give perfect regulation at all speeds. Exhaust valve push rod is completely covered.

Model		2R12	3R20	4R30
Each		**$74.00**	**94.00**	**110.00**
H.P.		2	3	4
Bore and Stroke	in.	3¼x4½	3½x4½	3¾x4½
Piston Displacement	cu.in.	37.33	43.29	49.70
Speed	r.p.m.	400–800	400–850	450–900
Valve Port	in.	1 7/16	1 7/16	1 7/16
Diam. Piston Pins	in.	¾	¾	¾
Connecting Rod Bearings	in.	1⅜x1½	1⅜x1½	1⅜x1½
Flywheel	in.	12x2	14x2	14x2
Pulley, Put on Either Side	in.	4x4	4x4	4x6
Fuel Capacity	gal.	1	1¼	1¼
Water Capacity	gal.	2½	3	4½
Length	in.	25	25	25
Width	in.	21¼	22½	22½
Height	in.	15⅛	17⅜	22⅜
Shipping Weight	lbs.	225	265	285

Cushman Husky Engines



¾ H. P.

A 4-cycle single cylinder air-cooled engine. Oversize valves, large gears, heavier crank and cam shafts, heavy roller bearings, more efficient carburetor, and cooling fan and shroud. Splash lubrication; constant oil level maintained by a plunger oil pump. Rings, 2 compression, 1 oil; ⅛ inch wide.

¾, 1, 1¼ H. P.

Bore, 2⅜ inches; stroke, 2½ inches; piston displacement, 11.08 cubic inches. Special forged silichrome valves, 1 inch in diameter. Valve stems and push rods completely enclosed and lubricated. Air blast around cylinder, overhead, and behind valves from magneto, flywheel fan. The 1¼ h.p. has an extra flywheel, fan and shroud. Speed, 1000 to 2400; recommended 1600 to 1800 r.p.m.

1½ H. P.

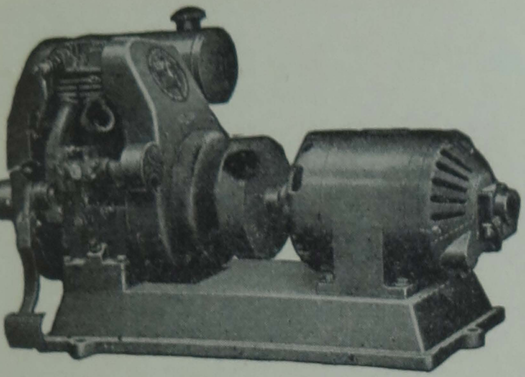
Same as the 1 h.p. with a few exceptions.

Bore, 2⅝ inches, stroke, 2½ inches; piston displacement, 13.53 cubic inches. Aluminum alloy cylinder head for better cooling. Drop forged, silichrome steel valves, 1¼ inches in diameter. Exhaust valve stem guide insert of special alloy cast. Special heat-resisting cast alloy valve seat inserts, froze in block. Valves require grinding only at long intervals.

H.P.		¾	1	1¼	1½
Each		**$50.00**	**55.00**	**60.00**	**64.00**
Weight Each	lbs.	60	63	70	73

Cushman Electric Light and Power Plants

Husky



For small homes, cottages and cabins; road, building and construction work and all other places where reliable and portable light plants are needed.

The Husky Engine is of the air-cooled, four-cycle type. It is fully enclosed and self-oiling. Equipped with roller bearings, positive oil pump, throttling governor, dependable carburetor and fool-proof ignition. The engine and generator are mounted on a rigid, heavy, iron base.

All models are 26 inches long, 14 inches wide and 20 inches high. Approximate weight each, 200 pounds.

Model 1M92

A well balanced plant for small homes, camps, cottages, etc. Has control cabinet with necessary simple instruments. Operates all regular 110 v., a.c. equipment, including radios. Cannot be used with storage batteries. Has a 500 watt (½ KW), 110 v., 60 cycle a.c. generator; 1 h.p. Husky Engine.

Master Husky

Consists of a reliable, simple Cushman Engine, a sturdy Electric Generator and a Cushman Storage Battery. The engine and generator are directly coupled together by a flexible coupling. The generator requires only one small meter.

Generator

Generator Unit.—Completely enclosed against dirt and moisture. Cover may be easily removed for inspection.

Capacity.—750 watts, continuous at 40° C. rise.

Voltage.—36 volt for charging 16 cells; 110 volt for 56 cells.

Bearings.—Oversize, enclosed annular ball. Will not wear and allow the armature to drag on the field.

Leads.—Enclosed and protected. Come out under the instrument box.

Instruments.—Ammeter, automatic cut-out, fuses; mounted in tight box on generator. Simply fasten house and battery wires onto box and the plant is ready to go.

Engine Cushman Husky

Power.—Ample size, 1½ h.p. at 1725 r.p.m.

Bore.—2⅝ inches; stroke, 2½ inches.

Piston.—Strut type, aluminum alloy; 2 compression and 1 oil ring.

Bearings.—Taper roller.

Lubrication.—Cam driven, plunger oil pump.

Carburetor.—Tillotson with automatic choke.

Fuel.—Gasoline, special large tank may be used; regular tank holds two gallons.

Starting.—Push switch. Can be started from remote points. Special carburetor choke makes this possible.

Model 2M8D3

Can be used on a regular farm light battery or heavy automobile batteries. Cranks from the batteries by pushing a button. Equipped with simple control and instruments. Will charge a 160 amp. battery. Has a 750 watt (¾ KW), 32 v., d.c. generator, powered with a 1½ h.p. Husky Engine.

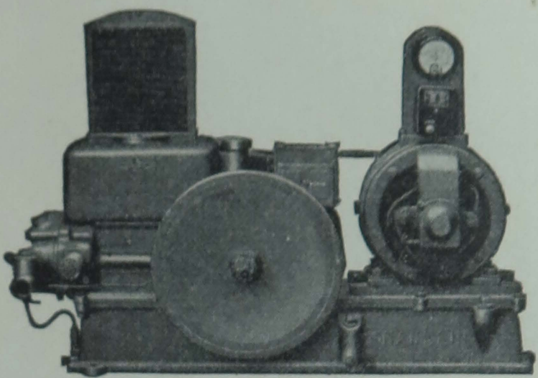
Model 2M9D3

Generally used without batteries; suited for contractors, cottages and summer homes. Has a 750 watt (¾ KW), 110 v., d.c. generator, powered with a 1½ h.p. Husky Engine.

Cushman Plants can be had in the light portable types for camps, boats, contractors' movable equipment, and also heavy-duty plants for large users or continuous service. Plants operate on gasoline, tractor fuel or kerosene.

Prices upon application.

Cushman Franklin Electric Light Plants



The Cub engine which is built into these plants is fully enclosed and roller bearing equipped.

Special mixer can be furnished for engine to operate on kerosene distillate or natural gas.

Condenser is regular equipment; there is no loss of water. For installation in dairies, special hot water tank furnished on request. The control cabinet is simple and reliable. The instruments are protected against moisture.

All Franklin Plants are especially quiet and very economical in operation.

Model 2R8D3, 750 Watts 32 Volts

For Use with Storage Battery

The plant is completely assembled on a cast iron base holding 3½ gallons of gasoline. The crank case holds a large supply of lubricating oil from which entire engine is positively lubricated. The 750-watt plant is powered with a 2 h.p. roller bearing equipped, Cushman Cub engine. The heavy duty type generator is driven by 2 V-belts giving smooth performance. Plant is complete with control cabinet, ammeter, starting switch, cut-out and fuses.

Base dimensions: Length 36 inches, width 12 inches.

Shipping weight, 410 pounds.

Model 3R8D5, 1500 Watts 32 Volts

Same style as Model 2R8D3. The plant is larger; has a 3 h.p. engine and 1500-watt generator driven by 3 V-belts.

Base dimensions: Length 36 inches; width 12 inches.

Shipping weight, 506 pounds.

Model 2R9D3, 750 Watts 110 Volts D.C.

Furnished with control cabinet equipped with voltmeter and fuses.

Gasoline base capacity, 3½ gallons.

Base dimensions: Length 36 inches; width 12 inches.

Shipping weight, 410 pounds.

Model 3R9D5, 1500 Watts 110 Volts D.C.

This plant is the same design as Model 2R9D3 but has 1500-watt generator and powered with 3 h.p. Cub engine.

Base dimensions: Length 36 inches; width 12 inches.

Shipping weight, 506 pounds.

Model 2R94, 1000 Watts 110 Volts A.C. 60 Cycles

This plant assembly consists of 1000-watt a.c. generator, driven through 2 V-belts by a 2 h.p. Cub engine. Control cabinet is fitted with voltmeter, rheostat and fuses. Same large gasoline and oil base as used in other Franklin models.

Base dimensions: Length 36 inches; width 12 inches.

Shipping weight, 520 pounds.

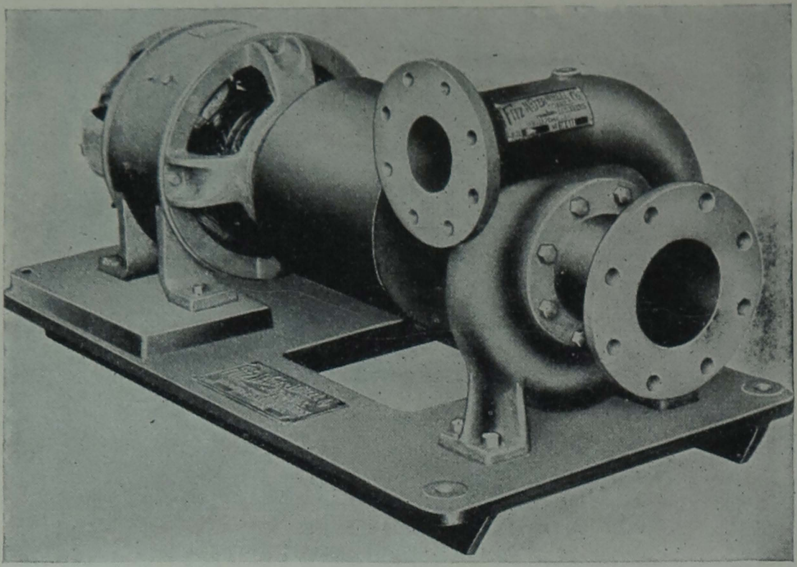
Model 4R96, 2000 Watts 110 Volts A.C. 60 Cycles

This plant is same design as Model 2R94 but has 2000-watt generator and is powered with a 4 h.p. Cub engine using 3 V-belts.

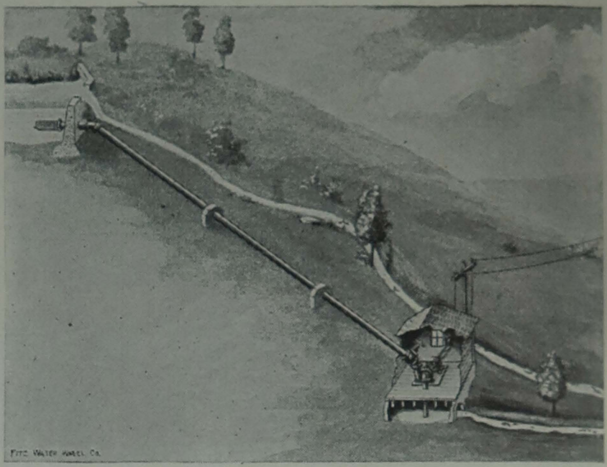
Base dimensions: Length 36 inches; width 12 inches.

Shipping weight, 575 pounds.

Fitz Ruralite Turbo-Generators



Complete Turbo-Generator Unit With Built-In Automatic Governor


FITZ WATER WHEEL CO.

Typical Installation

The Fitz Ruralite is a new patented automatic self-governing lighting plant for rural homes, run entirely by water power. Supplies electric lights and power for country homes, summer camps and hotels, etc.

The Ruralite unit consists of a water turbine, direct coupled to a suitable electric generator. The complete unit is mounted on a cast iron base, and provided with the proper size of flange to bolt to the pipe that conveys the water to the water wheel.

Automatically self-governing. No matter what loads are thrown off the plant, the voltage will remain within reasonable limits. The automatic governor reduces the volume of water used by the turbine whenever any of the lights are turned off.

A small pipeline comes down the hill and supplies the Ruralite with water under pressure, and then the expense is over. No gasoline, coal, or kerosene—all more or less treacherous and dangerous—to buy after the Ruralite is installed. The plant may be located as near or far away from the house as circumstances may require.

Will furnish standard 110 to 125 volt current d.c. that can be used at considerable distances from the water wheel.

Each plant undergoes an actual working test before it leaves the factory.

Specimen Power Tables

In the following tables, the volume of water specified in each case represents the amount of water (in cubic feet per minute) used by the water wheel when operating at full capacity, under the head specified. The diameter specified for the feed pipe is the size that should be used, provided the length does not exceed that specified. A larger diameter is required for longer pipes. To convert cubic feet per minute into Miners Inches, divide by 1.50.

2½-Inch Diameter Inlet Ruralites

Net Effective Fall . . . ft.	**25**	**30**	**35**	**40**	**45**	**50**	**60**	**70**	**80**
Amount of Water Used per Minute . . . cu. ft.	24.9	27.0	28.7	30.4	32.0	33.5	37.7	40.7	43.5
Power Developed on Water Wheel Shaft . . . h.p.	.92	1.25	1.53	1.84	2.12	2.40	3.35	4.29	5.25
Maximum Output in Kilowatts . . .	.500	.72	.90	1.10	1.28	1.45	2.02	2.59	3.16
Diameter of Feed Pipe . . . in.	5	5	5	5	6	6	6	6	6
Maximum Length Pipeline of Diameter Specified . . . ft.	150	180	210	240	270	300	360	420	480
Additional Head Required for Pipe Friction . . . ft.	3	4	5	3	4	5	5	7	9
Maximum Length of Draft Tube . . . ft.	6	6	6	7	7	7	8	9	9
Type of Rotor Furnished . . .	A	A	A	A	A	A	C	C	C

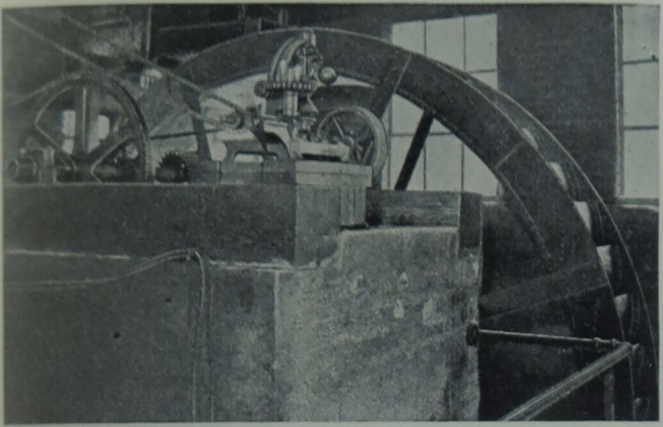
3½-Inch Diameter Inlet Ruralites

Net Effective Fall . . . ft.	**12**	**16**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**60**	**70**	**80**
Amount of Water Used per Minute . . . cu. ft.	53.2	60.2	66.4	60.6	61.2	62.4	63.6	65.3	67.0	87.1	94.1	100.5
Power Developed on Water Wheel Shaft . . . h.p.	1.08	1.55	2.03	1.56	2.58	3.45	4.20	4.90	5.55	7.75	9.92	12.13
Output in Kilowatts . . .	.620	.950	1.22	.94	1.56	2.08	2.54	2.95	3.35	4.67	5.98	7.30
Diameter of Feed Pipe . . . in.	6	7	7	7	7	7	7	7	7	8	8	8
Maximum Length Pipeline of Diameter Specified . . . ft.	75	100	125	150	180	210	240	270	300	360	420	480
Additional Head Required for Pipe Friction . . . ft.	1.5	1.5	2	2	3	3	3	4	5	6	7	8
Maximum Length of Draft Tube . . . ft.	3	4	4	6	6	6	7	7	7	8	9	9
Type or Rotor Furnished . . .	B	B	B	A	A	A	A	A	C	C	C	C

Hydro electric plants (larger capacity ruralites) are also manufactured in larger sizes.

Some types can be used under heads as little as 4 feet.

Fitz Overshoot Water Wheels



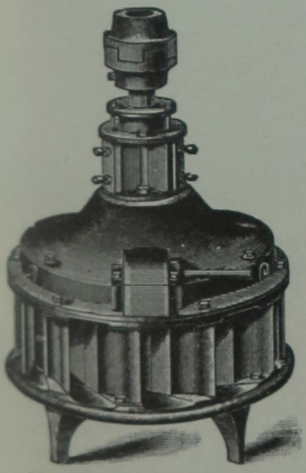
Fitz Overshoot Automatically Regulated by Fitz Governor

Water power is the cheapest and most satisfactory source of energy, wherever it can be obtained. A water power plant costs practically nothing to operate, whereas with any other kind of power, the expense is just beginning, after the engine or motor is in place.

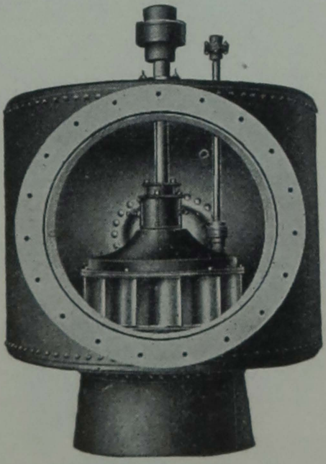
Almost any swiftly falling stream can be made to furnish sufficient power for pumping water under pressure for household purposes. Many farms have small brooks that are large enough to furnish plenty of power for lights and refrigerator and radio. Frequently, enough power can be secured for cooking, operating heating devices, sawing firewood and for many other purposes.

Complete information and detailed specifications will be sent upon request.

Water Turbines



For Mounting in Wood or Concrete Penstock



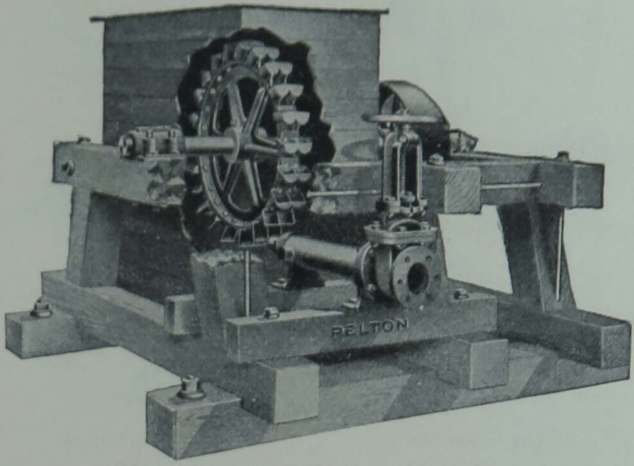
Mounted in Steel Case

Built in stock sizes and furnished either for mounting in wood or concrete penstock, or it is mounted in an iron or steel case. These wheels can be mounted either vertically or horizontally, depending upon conditions, in water tight iron or steel cases, affording a strong serviceable and compact power unit.

The cases in which the turbines are mounted are equipped with a flange, ready to be bolted to the end of the pipe line or flume. This is the simplest way of installing the turbine, it eliminates any leakage which might occur in a wood or concrete penstock, or box, in which it might be mounted, and is highly recommended.

Prices and further information furnished upon request.

Pelton Standard Water Wheels



With Interchangeable Cast-iron Buckets

Equipment comprises one Pelton Wheel, with interchangeable cast-iron buckets. One steel shaft, key-seated for wheel and pulley. Three babbitted journal bearings and set collars. One nozzle of the rigid or plain type. Two interchangeable nozzle tips bored respectively for the full power of the wheel and for approximately ¾ of the full power; or at purchaser's option, the nozzle tips may be bored for any amount of power within the range of the wheel's capacity. One flanged, bronze-mounted, single disc gate valve of the outside-screw, rising-spindle type. One set of foundation bolts, frame bolts and washers. One blue print and bolt list to permit purchaser constructing the wood frame and cover housing at destination. Pulleys and timber frames are not furnished as a part of the standard equipment, but will be supplied when desired at an addition to the sales price.

Prices and special bulletin upon application.

Head and Pressure Equivalents

Feet Head of Water and Equivalent Pressures

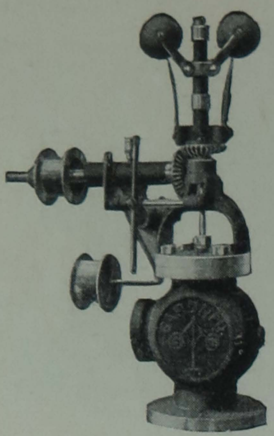
Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.
1	.43	30	12.99	140	60.63	300	129.93
2	.87	40	17.32	150	64.96	325	140.75
3	1.30	50	21.65	160	69.29	350	151.58
4	1.73	60	25.99	170	73.63	400	173.24
5	2.17	70	30.32	180	77.96	500	216.55
6	2.60	80	34.65	190	82.29	600	259.85
7	3.03	90	38.98	200	86.62	700	303.16
8	3.46	100	43.31	225	97.45	800	346.47
9	3.90	110	47.64	250	108.27	900	389.78
10	4.33	120	51.97	275	119.10	1000	433.09
20	8.66	130	56.30	...	......	....	......

Pressure and Equivalent Feet Head of Water

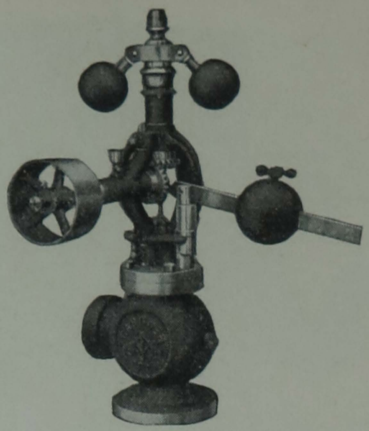
Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head
1	2.31	20	46.18	120	277.07	225	519.51
2	4.62	25	57.72	125	288.62	250	577.24
3	6.93	30	69.27	130	300.16	275	643.03
4	9.24	40	92.36	140	323.25	300	692.69
5	11.54	50	115.45	150	346.34	325	750.41
6	13.85	60	138.54	160	369.43	350	808.13
7	16.16	70	161.63	170	392.52	375	865.89
8	18.47	80	184.72	180	415.61	400	922.58
9	20.78	90	207.81	190	438.90	500	1154.48
10	23.09	100	230.90	200	461.78	1000	2309.00
15	34.63	110	253.98	...	......	....	......

We are in position to supply many items not shown in this catalogue and shall be pleased to receive your inquiries.

Class A Gardner-Denver Engine Governors



Spring Governor



Standard Governor

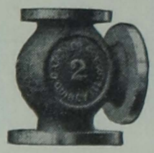
The standard governor is of the gravity action type, especially adapted for larger stationary engines. Speed is varied by position of a weight on the lever. Automatic safety stop is simple and reliable. Action is accomplished by permitting a slight oscillation of the shaft bearing which is held centered by the belt pull. If belt breaks or slips off pulley the support of the fulcrum is forced back, allowing the fulcrum to drop, instantly closing the valve.

The spring governor is recommended for traction and high speed stationary engines. It is quick and sensitive in action and therefore capable of responding promptly to various changes in load.

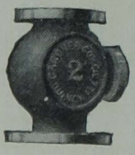
Spring		Standard			
Size Inches	Price Each	Size Inches	Price Each	Size Inches	Price Each
½	$25.00	2	$48.00	6	$220.00
¾	27.00	2½	64.00	..	....
1	29.00	3	80.00	8	386.00
1¼	33.00	3½	97.00	10	546.00
1½	40.00	4	120.00	..	....
2	48.00	5	175.00	..	....

As regularly furnished, the 1¼-inch size and smaller have screwed side and base; 1½ and 2-inch have screwed side and flanged base; larger sizes have flanged side and base. Other style valve chambers can be furnished.

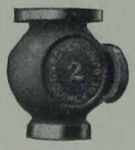
Governor Valve Chambers



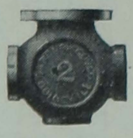
Style E



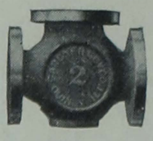
Style F



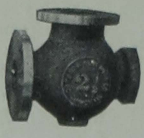
Style G



Style H



Style I



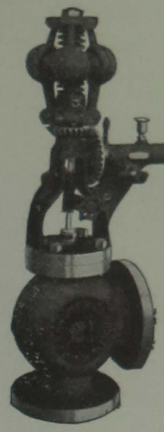
Style J

The above illustrations show the different styles of valve chambers used on Gardner Governors. In addition to these, chambers can be furnished with flanges square, triangular, or oblong, and of such diameters and dimensions as will suit the particular engines for which they are required. Flanges are always furnished blank except when ordered drilled, for which a small extra charge is made. When sending templets for the drilling of flanges on chambers E and F, be sure to mark on the templet for the base flange the relative position of the steam inlet.

When governors are purchased in quantities no extra charge is made for special flanges or drilling.

Semi-steel or steel chambers are furnished for extra heavy pressures or superheated steam at a slight additional cost.

Class B Gardner-Denver Wide Range Engine Governors



Class B Governors are without automatic stops.

The speeding attachment permits an unusually wide range in engine speed without in the least affecting the regulation.

May be fitted with attachment so that speed of engine may be controlled from engineers' cab, or from any other location most convenient for the user. By the use of a rod this extension may be carried to any reasonable distance desired.

This extension, however, is furnished only on special order and at extra cost.

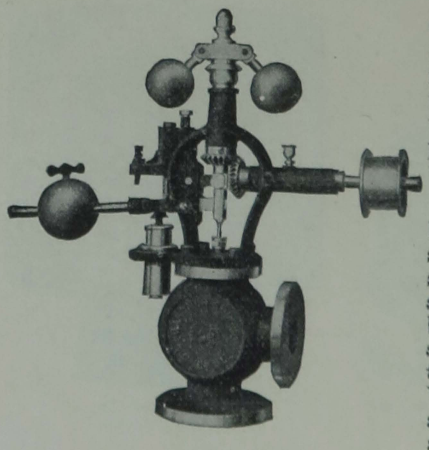
The design is neat, workmanship is accurate, and finish superior throughout. Governor is sensitive, rugged, and durable, and will give the best of satisfaction on all classes of engines, but it is particularly suited for those where a wide range in speeds is demanded.

Regularly adjusted to give a speed variation of 65 per cent. When service conditions are unusual, or where extremely close regulation is required, full information must be given so that governor can be properly adjusted before order is filled.

Price, Size **2** Inches	each **$40.00**
Price, Size **2½** Inches	each **54.00**
Price, Size **3** Inches	each **68.00**
Price, Size **3½** Inches	each **83.00**
Price, Size **4** Inches	each **102.00**
Price, Size **5** Inches	each **149.00**
Price, Size **6** Inches	each **187.00**

Gardner-Denver Speed and Pressure Regulators

For Steam-Actuated Air Compressors



Made in Class A, with automatic stop attachment. Furnished with a speeder through which an extreme variation of 25 per cent can be obtained.

Valve chambers can be furnished of any style. In ordering, state air pressure desired. Regulators can be provided for pressures from ten to one thousand pounds. When no instructions are given they are sent adjusted for 100 lbs.

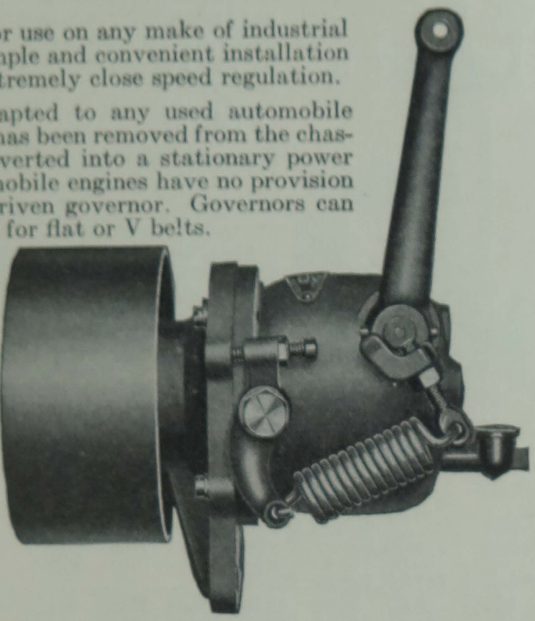
Size Inches	Diam., Inches Base Flanges	Diam., Inches Side Flanges	Diameter Pulley Inches	Speed R.P.M.	Ship. Wt., Lbs. Class A	Price, Each Class A
1½	5	Screwed	3	250	75	$54.00
2	6	Screwed	5	200	130	66.00
2½	7	7	5	200	150	82.00
3	7½	7½	5½	170	200	92.00
3½	8½	8½	5½	170	215	107.00
4	9	9	6	160	325	132.00
5	10	10	7	150	480	193.00
6	11	11	7	150	530	242.00

Pierce Engine Governors

Universal—Belt Driven

Suitable for use on any make of industrial engine. A simple and convenient installation providing extremely close speed regulation.

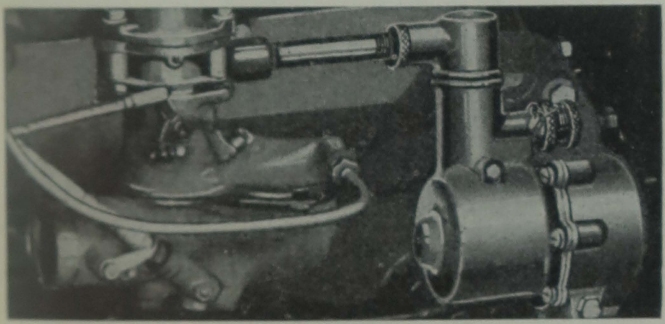
Easily adapted to any used automobile engine that has been removed from the chassis, and converted into a stationary power unit. Automobile engines have no provision for a gear-driven governor. Governors can be furnished for flat or V belts.



Suitable for use on engines operating electric welding sets, electric lighting plants, refrigerating units, air compressors, hoists, drag lines, feed grinders, tractors, ensilage cutters, pumps, saw mills and any job requiring uniform engine speed.

With Screw Speed Adjustment.................each	$20.00
With Lever Speed Adjustment.................each	22.00

For Model A and Model B Ford Engines



This governor is of the engine driven type. The governor valve box bolts between the carburetor and the intake manifold flange.

After installation the governor can be set at any desired speed and then sealed to prevent any tampering on the part of the driver.

Prevents excessive speed and reduces maintenance costs.

When ordering specify whether for Model A or Model B Ford engines.

For Models A and B Ford Engines.............each	$22.50

For Ford V8 Engines

This governor is of the centrifugal or flyball type.

Governor valve remains wide open until engine reaches speed for which governor is adjusted, allowing engine to develop its maximum power for any emergency. The governor valve box bolts between carburetor and intake manifold and a V pulley, driven by the fan belt, operates governor mechanism. Governor can be sealed to prevent any tampering by the driver.

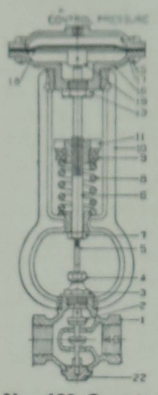
In ordering governors for Ford V8 engines, always state whether they are for single or dual carburetors.

Order Model A1 governor for following speeds: Passenger and light delivery cars, 25 to 45 m.p.h.; heavy duty trucks, 20 to 30 m.p.h.

Order Model A2 governor for following speeds: Passenger and light delivery cars, 40 to 60 m.p.h.; heavy duty trucks, 30 to 50 m.p.h.

For Ford V8 Engines.........................each	$22.50

Davis Pump Governors

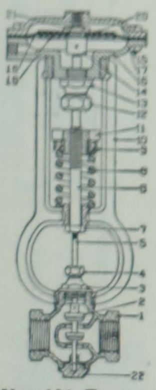


No. 180 Constant Pressure Diaphragm Type Screwed

No. 180, Constant Pressure
No. 181, Excess Pressure

Max. Hydraulic Pressures:
Diaphragm Type, 150 Lbs.
Piston Type, 500 Lbs.

Max. Steam Pressures:
Bronze Body, 300 Lbs.
Semi-Steel Body, 250 Lbs.
Steel Body, 400 Lbs.



No. 181 Excess Pressure Diaphragm Type Screwed

The action of steam pumps is automatically maintained by means of pump governors installed in the steam line and controlled by the discharge pressure.

Davis Constant and Excess Pressure Governors are made in spring loaded, diaphragm and piston types.

Standard Governors 1½ inches and smaller have bronze body and trim. Sizes 2 inches and larger have semi-steel body and bronze trim. They are equipped with parabolic discs guided top and bottom which gives full area port openings free from disc guide wings.

The disc stem is stainless steel and the push rod is brass. The yoke and diaphragm chamber are semi-steel. The diaphragm is rubber with heavy fabric insert. The steel spring is cadmium-plated to prevent corrosion.

	Bronze Body, Bronze Trim			Steel Body Monel or KA2 Trim		
Size In.	Screwed Each	Std. Flanged Each	Extra Heavy Flanged Each	Screwed Each	Series 300 Each	Series 400 Each
½	$50.00	......	......	$120.00	......	......
¾	55.00	......	......	125.00	......	......
1	60.00	......	......	135.00	......	......
1¼	65.00	......	......	150.00	......	......
1½	75.00	$80.00	$85.00	165.00	$175.00	$185.00
2	95.00	100.00	110.00	190.00	200.00	210.00
2½	115.00	125.00	135.00	210.00	220.00	230.00
3	145.00	155.00	165.00	260.00	270.00	280.00
3½	175.00	185.00	195.00	300.00	310.00	325.00
4	210.00	230.00	240.00	360.00	370.00	385.00

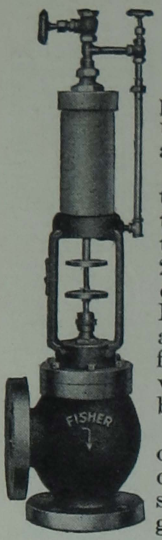
Semi-Steel Body

	Bronze Trim			Monel or KA2 Trim		
Size In.	Screwed Each	Std. Flanged Each	Extra Heavy Flanged Each	Screwed Each	Std. Flanged Each	Extra Heavy Flangod Each
2	$85.00	$90.00	$95.00	$100.00	$105.00	$110.00
2½	95.00	100.00	105.00	125.00	130.00	135.00
3	120.00	125.00	130.00	155.00	160.00	165.00
3½	135.00	140.00	145.00	175.00	180.00	185.00
4	170.00	175.00	180.00	215.00	220.00	225.00

FISHER
Valve Engineering Service

There isn't space in this catalog to show all of the Fisher regulating, reducing and control valves we can furnish . . . We will gladly furnish engineering information concerning the various types of valves suited to your particular needs.

Tell Us Your Valve Needs



No. 1 Fisher Constant Pressure Pump Governors

Recommended for the automatic control of pumps working under pressure. They maintain uniform discharge pressure, regardless of any variation in the initial pressure.

Adjustment on this governor is made by two small wheels, one acting as a lock nut, the other being the adjusting wheel. As easy to adjust when set at 400 or 500 pounds as at 25 pounds, for one does not have to overcome the compression of spring or pump load. No tools are necessary other than the thumb and finger. The regular brass pipe work as furnished consists of a special tee with globe valve and by-pass or blow-off pipe as required by Board of Underwriters.

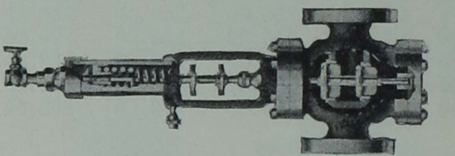
Capacity of this governor is 25 to 500 pounds discharge, depending on the size of spring and cylinder used. Governor is equipped with spring and cylinder best suited to pressures given on order.

Globe or Angle

Pipe Sizes In.	Semi-Steel Body Duromite Bronze or Nickel Iron Trim			Semi-Steel Body Nickel Alloy or 18-8 Stainless Steel Trim			Cast Steel Body Nickel Alloy or 18-8 Stainless Steel Trim	
	Screwed Each	Standard Flgd. Ea.	Ex. Hvy. Flgd. Ea.	Screwed Each	Standard Flgd. Ea.	Ex. Hvy. Flgd. Ea.	Screwed Each	Series 30 Series 40 Flgd. Ea.
* ½-¾	$42.00	$52.00	$55.00	......	......	......	......	......
½-¾	50.00	60.00	62.50	$70.00	$70.00	$72.50	$110.00	......
1	50.00	60.00	62.50	70.00	70.00	72.50	120.00	$140.00
1¼	50.00	60.00	62.50	75.00	75.00	82.50	130.00	150.00
1½	60.00	65.00	67.50	85.00	85.00	95.00	145.00	170.00
2	70.00	75.00	80.00	100.00	100.00	110.00	175.00	185.00
2½	80.00	85.00	90.00	115.00	115.00	125.00	.....	210.00
3	100.00	105.00	115.00	......	135.00	145.00	.....	255.00
3½	115.00	120.00	130.00	......	155.00	165.00	.....	280.00
4	140.00	145.00	155.00	......	185.00	195.00	.....	320.00
5	......	180.00	195.00	......	240.00	255.00	.....	405.00
6	......	225.00	240.00	......	275.00	290.00	.....	500.00

*Bronze body.

No. 101 Fisher Constant Pressure Pump Governors



Designed for use where it is necessary to place the governor in a vertical position, or inverted in a horizontal pipe line.

Inner valve has a guide or pilot which keeps it in alignment regardless of position of governor. Adjustment is made by means of 2 small wheels.

Governor capacity is 10 to 500 pounds discharge pressure depending on size of spring and cylinder. Equipped with spring and cylinder best suited to requirements.

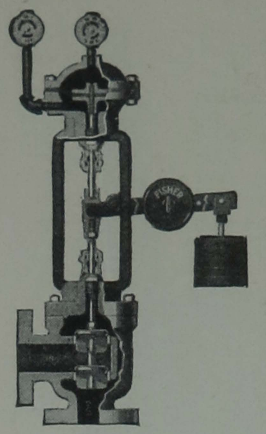
When ordering, advise when this type is wanted or the regular Type No. 1 will be shipped.

Globe or Angle

Pipe Sizes In.	Semi-Steel Body Duromite Bronze or Stainless Iron Trim			Semi-Steel Body Nickel Alloy or 18-8 Stainless Steel Trim			Cast Steel Body Nickel Alloy or 18-8 Stainless Steel Trim	
	Screwed Each	Standard Flanged Each	Extra Heavy Flanged Each	Screwed Each	Standard Flanged Each	Extra Heavy Flanged Each	Screwed Each	Series 30 Series 40 Flanged Each
*½-¾	$42.00	$52.00	$55.00	......	......	......	......	......
½-¾	50.00	60.00	62.50	$70.00	$70.00	$72.50	$132.50	......
1	50.00	60.00	62.50	70.00	70.00	72.50	140.00	$140.00
1¼	50.00	60.00	62.50	75.00	75.00	82.50	150.00	150.00
1½	60.00	65.00	67.50	85.00	85.00	95.00	170.00	170.00
2	70.00	75.00	80.00	100.00	100.00	110.00	185.00	185.00
2½	80.00	85.00	90.00	115.00	115.00	125.00	......	210.00
3	100.00	105.00	115.00	......	135.00	145.00	......	255.00
3½	115.00	120.00	130.00	......	155.00	165.00	......	280.00
4	140.00	145.00	155.00	......	185.00	195.00	......	320.00
5	......	180.00	195.00	......	240.00	255.00	......	405.00
6	......	225.00	240.00	......	275.00	290.00	......	500.00

*Bronze body.

No. 4 Fisher Excess Pressure Pump Governors



For boiler feed pumps of ordinary plunger or steam-driven turbine type, where feed water is regulated by hand or automatically by water line regulator. Maintains a fixed over pressure in feed line, regardless of variation in steam pressure, by automatically controlling and regulating speed of pump or turbine according to requirements of boilers. Works satisfactorily whether supplying one or a battery of boilers. By connecting steam pressure to under side and feed line pressure to upper side of diaphragm, they are equalized so diaphragm has to withstand only slight excess pressure necessary to overcome weight and lever and close steam valve

Globe or Angle

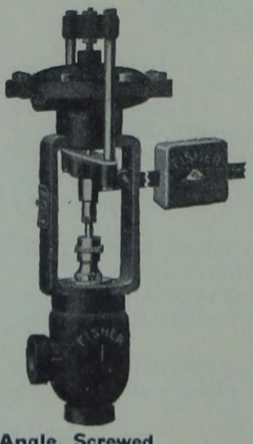
Pipe Sizes In.	Semi-Steel Body Duromite Bronze or Stainless Iron Trim			Semi-Steel Body Nickel Alloy or 18–8 Stainless Steel Trim			Cast Steel Body Nickel Alloy or 18–8 Stainless Steel Trim	
	Screwed Each	Standard Flanged Each	Ex. Hvy. Flanged Each	Screwed Each	Standard Flanged Each	Ex. Hvy. Flanged Each	Screwed Each	Series 30 Series 40 Flanged Each
* ½-¾	$42.00	$52.00	$55.00	......	......	......	......	......
½-¾	50.00	60.00	62.50	$70.00	$70.00	$72.50	$132.50	......
1	50.00	60.00	62.50	70.00	70.00	72.50	140.00	$140.00
1¼	50.00	60.00	62.50	75.00	75.00	82.50	150.00	150.00
1½	60.00	65.00	67.50	85.00	85.00	95.00	170.00	170.00
2	70.00	75.00	80.00	100.00	100.00	110.00	185.00	185.00
2½	80.00	85.00	90.00	115.00	115.00	125.00	......	210.00
3	100.00	105.00	115.00	......	135.00	145.00	......	255.00
3½	115.00	120.00	130.00	......	155.00	165.00	......	280.00
4	140.00	145.00	155.00	......	185.00	195.00	......	320.00
5	......	180.00	195.00	......	240.00	255.00	......	405.00
6	......	225.00	240.00	......	275.00	290.00	......	500.00

*Bronze body.

No. 8 Fisher Vacuum Pump Governors

For vacuum pumps used in connection with vacuum systems of heating, or wherever a certain number of inches of vacuum must be maintained, a governor is essential and it must be sensitive in all the word implies. In the No. 8 Fisher Governor, unnecessary friction is eliminated. The large controlling area of the diaphragm makes it sensitive. Lever and weight control is positive, never changing; this governor is guaranteed to maintain the desired amount of vacuum closer than any hand regulation. There is only one adjustment and any desired amount from the lowest to the highest vacuum can be secured by moving the weight on the lever.

Speed of pump is controlled by piping vacuum from suction end of pump to under side of diaphragm. This forms a balance with lever and weight, opening and closing steam valve, holding a steady vacuum. Diaphragm and lever mechanism may be swiveled in any direction desired.



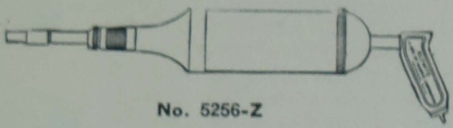
Angle, Screwed

Size Inches	Angle or Globe		
	Screwed 250-Lb. Pres. Each	Standard Flanged 125-Lb. Pres. Each	Ex. Heavy Flanged 250-Lb. Pres. Each
*½	$42.00	$52.00	$55.00
*¾	42.00	52.00	55.00
½	50.00	60.00	62.50
¾	50.00	60.00	62.50
1	50.00	60.00	62.50
1¼	50.00	60.00	62.50
1½	60.00	65.00	67.50
2	70.00	75.00	80.00
2½	80.00	85.00	90.00
3	100.00	105.00	115.00

*Bronze body.

Alemite Push Type Hand Guns

Automatic Type


No. 5256-Z

The push type hand gun is equipped with nozzle which seals on outer rim of push type fittings. This simple method of sealing at the point of contact cuts down the length of time required for lubrication. Guns are of two types, automatic type in which the high pressure chamber is automatically primed by action of gun, and vacuum type in which lubricant is delivered to high pressure piston by atmospheric pressure.

No.	5256-Z	6554-Z	5257-Z	*5586-Z	5585-Z	6556-Z
Each	$10.00	8.00	6.75	6.30	4.00	2.30
Cap. lbs.	1¾	1¾	1	9/16	9/16	5/16

*With filler handle.

Alemite Button Head Fittings

Straight Type

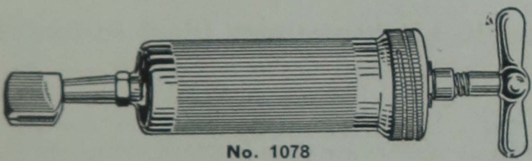
No. A-1184

No. A-1186

No.	Description	Each
	⅛-Inch Pipe Thread	
*C-69	⅞ Inch Long	$.16
A-1184	¾ Inch Long	.12
1246	⅝ Inch Long, 3/16-Inch Thread	.20
1531	¾ Inch Long, Brass Body	.12
	¼-Inch Pipe Thread	
A-1186	⅞ Inch Long	$.14
1401	53/64 Inch Long, for Heavy Lubricant	.20

*Female Fittings; all others are male.

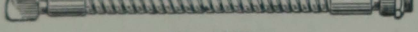
Alemite Button Head Guns


No. 1078

No.	Each	Description	Lgth. Overall Plgr. In.	I.D. Cyl. In.	Cap. Oz.
C-1048	$4.90	Small Gun	10½	1⅝	4
C-552	7.00	Double Duty Gun	13	1⅜	6
C-550	12.00	Triple Duty Gun (Acme Thrd.)	13	1⅜	6
1078	12.00	Large Gun (Acme Thrd.)	13½	2⅜	14

Alemite Button Head Flexible Hose

Regular


No. 1107

Equipped with button head couplings. To be used on Alemite guns for lubricating of bearings equipped with button head fittings.

No.	Each	Description	Approx. Length Inches	Size Conn. P.T.& Thrd.	Type of Coupling
1107	$6.30	Heavy Duty	15	¼	G-42030
1110	6.30	Heavy Duty	15	⅛	G-42030
1116	7.25	Heavy Duty	24	⅛	G-42030
1117	7.25	Heavy Duty	24	¼	G-42930
1145	6.30	Heavy Duty	15	¼	G-42052
1146	6.30	Heavy Duty	15	⅛	G-42052
1165	6.30	Heavy Duty	15	⅛	G-42452
1186	6.35	Hvy. Duty Rubber	25¾	¼	G-42930
1189	6.30	Heavy Duty	15	⅛	G-42930
1190	6.30	Heavy Duty	15	⅛	G-42932
5039	6.30	Heavy Duty	15	¼	G-42930
5571	8.00	Dlb. Ball Jointed	14½	⅛	G-42930
5572	8.00	Dlb. Ball Jointed	14½	¼	G-42930

Alemite Push Type Fittings

Straight

No. Z-35-A

No. Z-137-A

No. Z-85-A

No. Z-143-AA

No. 1444

The push type system derives its name from the fact that lubrication of bearings equipped with push type fittings is accomplished by sealing the nozzle against the fitting by means of a pushing action. Bearings can be lubricated very rapidly at high pressures by the use of push type fittings and hand guns. Drive fittings are used for lubrication of bearings in which the oil holes are drilled but not threaded.

No.	Description	Each
	10-32 Thread	
1453	No Ball Check	$.12
	⅛-Inch Pipe Thread	
Z-35-A	23/32 Inch Long	$.06
Z-85-A	1¼ Inches Long	.16
Z-87-AX	23/32 Inch Long	.23
Z-143-AA	Water Pump Fitting	.14
Z-141-A	Fitting Cap	.04
Z-604-A	2⅜ Inches Long	.21
1362	Reservoir Fitting	.70
1367	Double Check Fitting, 1¼ Inches Long	.27
1438	Non-Corrosive	.20
*1444	1 1/16 Inches Long	.13
1503	Oil Tight, ¾ Inch Long	.27
	¼-Inch Pipe Thread	
Z-137-A	29/32 Inch Long	$.14
†1295	32-Thread, 11/16 Inch Long	.13
†1454	28-Thread, ⅜ Inch Long	.12
*1513	1¼ Inches Long	.23
†1584	28-Thread, 11/16 Inch Long	.14
	5/16-Inch Pipe Thread	
†Z-694-A	32-Thread, 19/32 Inch Long	$.14
†1218	32-Thread, No Bal! Check	.11
†1579	32-Thread, Oil Tight	.25
	⅜-Inch Pipe Thread	
†Z-676-A	24-Thread, 23/32 Inch Long	$.27
1249	1¼ Inches Long	.27
	7/16-Inch Pipe Thread	
†1506	12-Thread Wood Screw Fitting	$.13
	Drive	
1342	⅛-Inch, No Ball and Spring	$.12
1522	⅛-Inch, No Ball and Spring	.13
1343	5/32-Inch, No Ball and Spring	.12
1290	3/16-Inch, No Ball and Spring	.14
1344	3/16-Inch, with Ball and Spring	.13
1502	3/16-Inch, No Ball and Spring	.13
1520	3/16-Inch, No Ball and Spring, Short Body	.13
1345	7/32-Inch, with Ball and Spring	.13
Z-678-A	¼-Inch, No Ball and Spring	.14
1346	¼-Inch, with Ball and Spring	.14
1347	9/32-Inch, with Ball and Spring	.14
Z-48-A	5/16-Inch, with Ball and Spring	.09
Z-347	5/16-Inch, No Ball and Spring	.05
1379	5/16-Inch, Flat Sides with Ball and Spring	.15
1348	11/32-Inch, Hexagon with Ball and Spring	.15
Z-120	⅜-Inch, No Ball and Spring	.11
1349	⅜-Inch, with Ball and Spring	.15
1351	7/16-Inch, with Ball and Spring	.16
Z-362	½-Inch, No Ball and Spring	.14
1388	½-Inch, with Ball and Spring	.18
	Grease Cups	
RZ-0	1¼-Inch Cup, ⅛-Inch Pipe Thread	$.45
RZ-1	1½-Inch Cup, ¼-Inch Pipe Thread	.55
RZ-2	2-Inch Cup, ¼-Inch Pipe Thread	.65
RZ-22	2-Inch Cup, ⅜-Inch Pipe Thread	.75

Tools

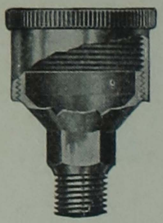
No. 5018

No. 5019

No.	Description	Each
5018	Assembly Tool for Straight Drive Fittings	$.50
5019	Assembly Tool for Elbow Drive Fittings	.50

*Female fittings; all others are male fittings.
†Special pipe thread.

No. 200 Empress Plain Steel Grease Cups



This cup is drawn from rolled metal, making it lighter, neater and stronger than a cast cup.

The metal is dense and uniform.

Breakage and leakage due to spongy metal and sand holes are eliminated.

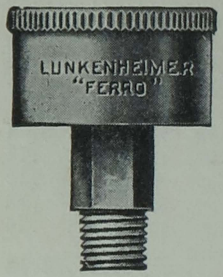
The threaded shank is stronger on a cup drawn from rolled sheet metal, and breakage is eliminated.

No.	000	00	0	1	2	3	4	5
Each	$.17	.20	.27	.33	.49	.72	1.08	1.80
I. D. in.	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2
Thread in.	1/8	1/8	1/4	1/4	3/8	1/2	1/2	3/4
Cap oz.	1/4	1/2	2/3	1	2	3 1/2	5	8

No. 1089 Lunkenheimer Ferro Pressed Steel Plain Base Grease Cups

Cap Screw Feed

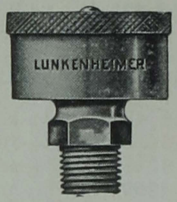
The shank is machined from a solid steel bar and the method has been adopted to not only avoid the deficiencies and inaccuracies of less costly processes but to obtain the strength anticipated in steel construction and to also insure correct service results.



Size No.	Cap. Oz.	I. P. Thread In.	O. D. In.	Ht. In.	Finished Price Each
000	1/8	1/8	7/8	1 7/16	$.40
00	1/2	1/8	1 1/8	1 9/16	.45
0	2/3	1/4	1 7/16	1 15/16	.60
1	1	1/4	1 5/8	2 1/16	.70
2	2	3/8	2 3/16	2 5/16	.85
3	3 1/2	1/2	2 5/8	3	1.20
4	5	1/2	3 1/8	3 1/4	1.80

No. 513 Lunkenheimer Tiger Bronze Packed Base Grease Cups

Cap Screw Feed

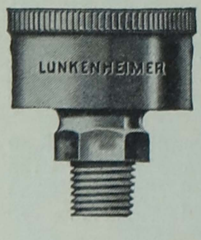


A simple, compact, efficient cup of the plain compression type. The base construction includes a renewable leather washer, which insures an effective seal against leakage around the threads, even when feeding the lighter grades of grease.

Size No.	Cap. Oz.	I. P. Thread In.	O. D. In.	Ht. In.	Price, Each Rough Bronze	Price, Each Fin. Bronze	Price, Each N. P. Bronze
000	1/8	1/8	7/8	1 7/16	....	$.50	$.60
00	1/2	1/8	1 1/8	1 1/2	$.56	.70	.82
0	2/3	1/4	1 1/2	1 3/4	.74	.90	1 06
1	1	1/4	1 5/8	1 15/16	.96	1.15	1 36
2	2	3/8	2 1/8	2 3/16	1.28	1.50	1.80
3	3 1/2	1/2	2 11/16	2 1/2	1.76	2.15	2 60
4	5	1/2	3 1/8	2 3/4	3.20	3.30	3.40

No. 556 Lunkenheimer Gem Bronze Plain Base Grease Cups

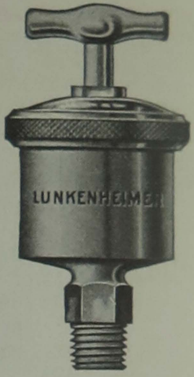
Cap Screw Feed



Designed for service where an exceptionally well-made bronze grease cup of plain design is demanded; it is recommended for any installation where bearings are not subject to unusual vibration.

Size Number	Cap. Ounces	I. P. Thread Inches	Height Inches	Price, Each Rough Bronze	Price, Each Finished Bronze
000	1/8	1/8	1 3/8	....	$.50
00	1/2	1/8	1 1/2	$.56	.70
0	2/3	1/4	1 13/16	.74	.90
1	1	1/4	2 1/16	.96	1.15
2	2	3/8	2 5/16	1.28	1.50
3	3 1/2	1/2	2 3/4	....	2.15
4	5	1/2	3	....	3.30

No. 512 Lunkenheimer Marine Screw Feed Grease Cups

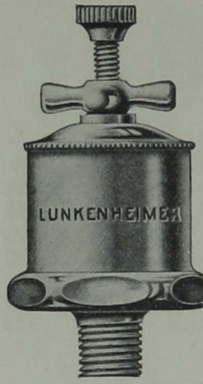


Designed more particularly for marine engines. However, it is also found suitable for other purposes where screw feed is desired, or where it is found necessary to force grease some distance to the parts to be lubricated. Thread is on plunger, instead of on stem, lessening leakage around plunger.

Size No.	O.D. In.	Ht. In.	Thd. In.	Cap. Oz.	Price Each Fin. Bronze	Price Each N. P. Bronze
00	1 3/8	3 3/8	1/8	1/3	$1.00	$1.20
0	1 3/4	4 5/16	1/4	1	1.20	1.45
1	2	4 7/8	1/4	1 1/2	1.60	1.90
2	2 5/8	5 15/16	3/8	3	2.00	2.40
3	3 3/16	7 1/16	1/2	6	2.80	3.40
4	3 5/8	8 1/8	1/2	10	4.00	4.75
5	4 5/16	10	3/4	18	7.00	8.20

No. 511 Lunkenheimer Brass Jewel Grease Cups

Automatic Feed

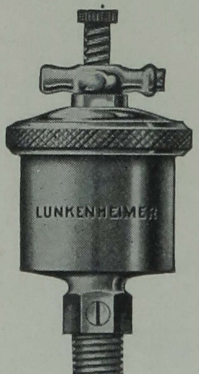


For service not demanding the employment of heavy greases and for installations requiring an automatic cup of the lightest practicable proportions. A cup shorter over all and lighter in weight than the automatic feed cast bronze patterns of similar capacity.

Size No.	Cap. Oz.	I. P. Thread In.	O. D. In.	*Height Over All In.	Price, Each Fin. Brass	Price, Each N. P. Brass
00	1/3	1/8	1 3/8	3	$.80	$1.00
0	1	1/4	1 3/4	3 9/16	1.00	1.30
1	1 1/2	1/4	2 1/16	4 1/16	1.30	1.70
2	3	3/8	2 1/2	5 1/4	1.70	2.20
3	6	1/2	3 1/8	6 9/16	2.30	2.90
4	10	1/2	3 11/16	7 5/8	3.20	3.90

*Plunger raised.

No. 510 Lunkenheimer Ideal Automatic Feed Grease Cups

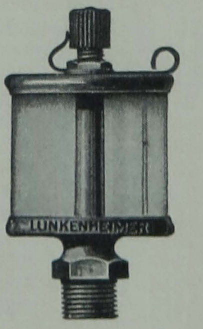


An excellent cup for use on engine crank pins, journals, etc. It is provided with a leather packed plunger which is easily raised when cup requires recharging with grease. Spring and plunger are controlled by a thumb nut, which has an automatic lock arrangement.

Size No.	O.D. In.	Ht. In.	Thd. In.	Cap. Oz.	Price, Each Fin. Bronze	Price, Each N. P. Bronze
00	1 3/8	3 1/4	1/8	1/3	$1.50	$1.75
0	1 3/4	4 3/8	1/4	1	2.00	2.25
1	2	4 15/16	1/4	1 1/2	2.50	2.80
2	2 5/8	6 1/16	3/8	3	3.20	3.60
3	3 3/16	7 3/16	1/2	6	4.30	5.00
4	3 5/8	8 5/16	1/2	10	6.00	6.75
5	4 5/16	10 1/8	3/4	18	12.50	13.80

No. 1297 Lunkenheimer Pioneer Oil Cups

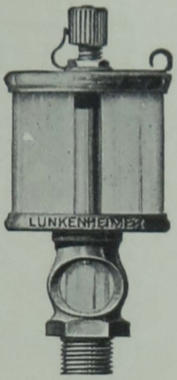
Recommended for use on stationary bearings. Equipped with needle valve feed control.



Size No.	Cap. Oz.	I. P. Thread In.	Height Over All Inches	Fin. Bronze Each
000	1/4	1/8	2 9/16	$2.00
0	5/8	1/8	3 1/16	2.25
1	1	1/4	3 3/8	2.50
1 1/2	1 1/2	1/4	3 3/4	2.75
2	2 1/2	3/8	4 1/8	3.00
3	4	3/8	4 1/2	3.50
4	5	3/8	5	4.00
5	10	1/2	5 7/8	5.50
6	18	1/2	6 15/16	7.50
8	34	3/4	8 3/16	14.50

No. 1298 Lunkenheimer Royal Oil Cups

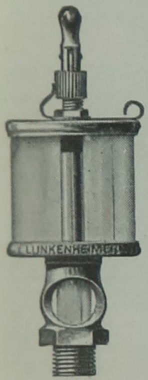
Recommended for use on stationary bearing. Equipped with needle valve feed control.



Size No.	Cap. Oz.	I. P. Thread In.	Height Over All Inches	Fin. Bronze Price Each
000	¼	⅛	3 1/16	$2.50
0	⅝	⅛	3⅞	2.75
1	1	¼	4 3/16	3.00
1½	1½	¼	4 7/16	3.25
2	2½	⅜	5	3.50
3	4	⅜	5¼	4.00
4	5	⅜	5¾	4.75
5	10	½	6¾	6.25
6	18	½	7¾	8.25
8	34	¾	8 13/16	15.50

No. 1300 Lunkenheimer Sentinel Oil Cups

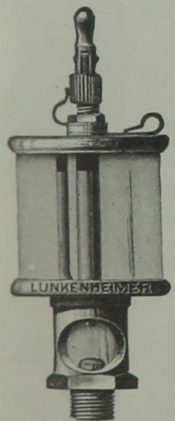
With Snap Lever Feed Control



Designed for use on stationary bearings.

Size No.	Capacity Oil Ounces	I.P. Pipe Thread Inches	Price, Each: Finished Bronze	Price, Each: Nickel-plated Bronze
0	⅝	⅛	$3.00	$3.65
1	1	¼	3.25	4.00
1½	1½	¼	3.50	4.30
2	2½	⅜	3.75	4.65
3	4	⅜	4.25	5.25
4	5	⅜	5.00	6.15
5	10	½	6.75	8.15
6	18	½	8.75	10.55
8	34	¾	16.00	19.00

No. 1301 Lunkenheimer Paragon Lubricators



For gas, gasoline or oil engine cylinders. Glass body; cast bronze base and top. Equipped with sight feed. Finished bronze lubricator furnished unless otherwise specified.

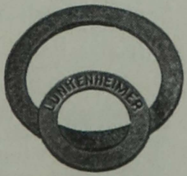
Size No.	Cap. Oz.	I. P. Thread In.	Height Over All Inches	Fin. Bronze Price Each
1½	1½	¼	5½	$4.75
2	2½	⅜	6	5.25
3	4	⅜	6¼	5.75
4	5	⅜	7	6.50
5	10	½	7¾	9.00
6	18	½	8¾	12.00
8	32	¾	10	25.00

Lunkenheimer Oil Cup Glasses and Washers

LUNKENHEIMER

No. 526

For lubricators, oil cups, oiling devices, etc. Glasses cylindrical in shape, clear, strong and uniform in size. Interchangeable with all styles of cups.

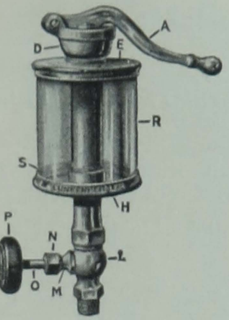


No. 1062

Size No.	O. D. In.	Ht. In.	No. 526 Glasses Price Each	No. 1062 Washers Price per Doz.	Size No.	O. D. In.	Ht. In.	No. 526 Glasses Price Each	No. 1062 Washers Price per Doz.
000	1	⅞	$.40	$.45	3	2¼	2⅛	$1.00	$1.30
00	1⅛	1	.50	.50	4	2½	2⅜	1.10	1.40
0	1¼	1⅛	.60	.60	5	3	3	1.30	1.70
1	1½	1⅜	.70	.80	6	3½	4	1.90	2.10
1½	1¾	1⅝	.80	1.00	8	4¼	5	4.30	3.50
2	2	1⅞	.90	1.20	10	5½	7	6.00	5.00

No. 495 Lunkenheimer Alpha Oil Pumps

250 Lbs. W. S. P.



The No. 495 Alpha Glass Body Oil Pump is adaptable to practically any installation as an auxiliary to regular engine pump or compressor cylinder lubricator. The funnel shaped top facilitates filling; lever design enables easy operation, and plunger construction insures positive discharge.

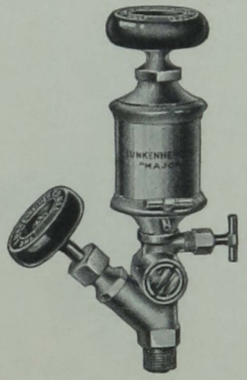
Has bronze base and top.

Size No.	I. P. Thread Inch	Capacity Pints	Price Each Bronze Finish
3	⅜	⅛	$7.50
5	⅜	½	8.50
6	½	1	10.00
8	½	2	15.00

No. 487 Lunkenheimer Major Bronze Lubricators

With Sight Feed, for Small Steam Engine and Pump Cylinders

200 Lbs. W.S.P.

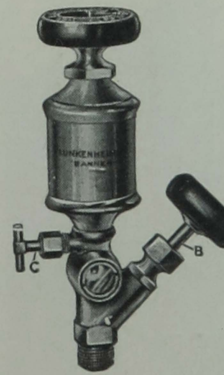


Bull's-eye glasses are provided. The space between the glasses is wide enough to prevent the oil spattering their surfaces under normal service conditions.

Size No.	Cap. Oz.	I. P. Thread In.	Price Each Finished Bronze
1	2¾	⅜	$4.00
2	3¾	½	5.00
3	5	½	6.00
4	6	½	8.00
5	10	½	10.00
6	18	¾	12.00

No. 489 Lunkenheimer Banner Bronze Lubricators

200 Pounds Pressure



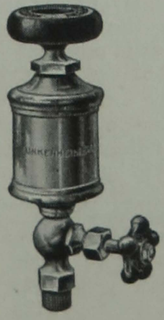
For air compressor cylinders and blowers.

Equipped with sight feed.

The stop valve controls the main inlet and discharge channel and permits refilling of the oil reservoir under service.

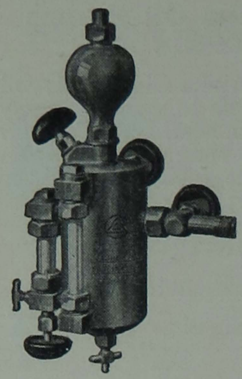
Size No.	Bronze Finished Each	Cap. Oz.	I.P. Thread In.
0	$4.40	2	⅜
1	4.60	2¾	⅜
2	5.00	3¾	½
3	6.00	5	½
4	8.00	6	½
5	10.00	10	½
6	12.00	18	¾

No. 498 Lunkenheimer Bronze Plain Engine Lubricators with Valve



The No. 498 Lubricator is furnished without drain cock or tube.

Size No.	Finished Bronze Each	Cap Oz.	I. P. Thread In.
0	$2.20	1	⅜
1	2.40	2	⅜
2	2.60	2¾	½
3	2.90	3¾	½
4	3.25	5	½
5	3.75	6	½
6	4.75	10	¾
7	7.00	18	¾
8	10.00	28	¾



Detroit Improved Standard Double Connection Lubricators

For use on all kinds of reciprocating steam engines, steam pumps, etc.

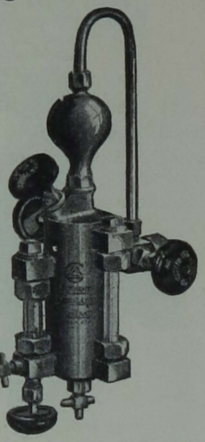
Installed with both connections between the boiler and throttle.

Finished in polished brass or nickel-plated.

Capacity.......................pints	⅓	½	1	2	4
Pipe Thread on Support Arm....inches	½	½	½	½	¾

Prices upon application.

Detroit Improved Standard Single Connection Lubricators



For use on all kinds of reciprocating engines, steam engines, steam pumps, etc., where conditions do not permit the installation of a double connection lubricator.

Connected to the steam pipe either above or below the throttle or into the steam chest direct.

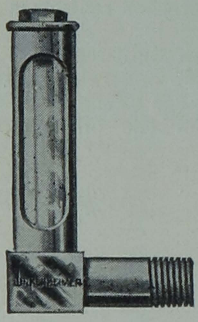
Finished in polished brass or nickel-plated.

Capacity Pints	Pipe Thread on Support Arm Inches	Capacity Pints	Pipe Thread on Support Arm Inches
⅓	½	1	½
½	½	2	½

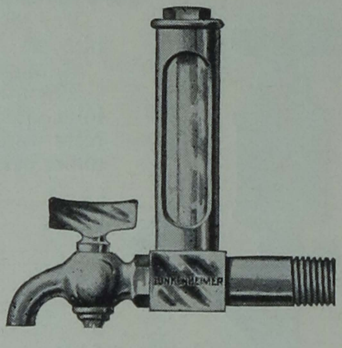
Prices upon application.

Lunkenheimer Bronze Oil Gauges

With Revolvable Shield



No. 528, Plain



No. 529, with Drain Cock

The economical results which self-oiling bearings and open crank cases are intended to effect are most uncertain unless the contents of the oil pocket or reservoir are readily observable.

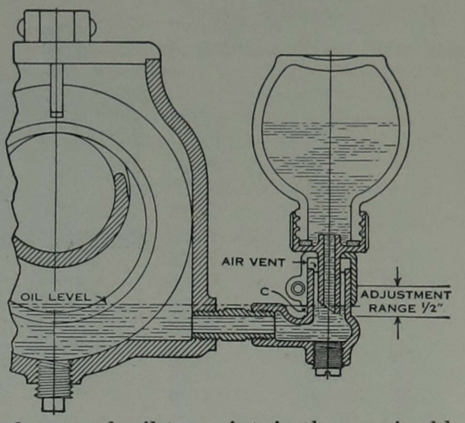
Lunkenheimer Oil Gauges embody features of unusual practical value. All parts are heavily proportioned. The slotted brass shield facilitates a clear vision of the oil level from any desired angle, and being revolvable, it permits the cleaning of the gauge glass without disassembling. A vent is provided in the cap at top to insure correct registering of the oil level within the glass.

No. 529 is equipped with a cock for draining the oil pocket.

Finished bronze oil gauges are supplied unless otherwise specified, and if number is not given No. 529 will be furnished.

Size In.	Price, Each			
	No. 528 Plain		No. 529 with Cock	
	Fin. Bronze	N. P. Bronze	Fin. Bronze	N. P. Bronze
⅛	$.40	$.55	$.80	$1.00
¼	.50	.65	.90	1.10
⅜	.65	.80	1.05	1.25
½	1.00	1.20	1.40	1.65

Lunkenheimer Alvor Constant Level Oil Controls



Automatically maintains a constant oil level in ring oiled bearings or antifriction bearings suitable for oil bath lubrication. It insures against failure of oil supply and consequent costly shutdown of equipment. Waste is eliminated as it feeds only enough oil to maintain the required level and as long as any oil shows in the glass bottle none need be added.

The Alvor feeds only when the oil level in the bearing is low enough to break the oil seal at the end of the shank, permitting air to enter bottle. It will not feed as long as the oil covers the hole in the end of the shank.

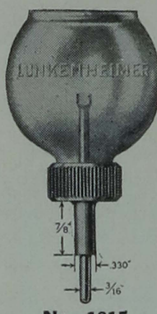
The tee fitting in which the device is inserted is provided with two ¼-inch pipe connections at right angles to each other, so that connection can be made either at the side or bottom of the bearing box.

To refill, the bottle with its base may be lifted out of the tee fitting without disturbing any connections.

Size No.	1	3	5
No. **1834**, Round.......................each	**$3.25**	**$3.50**	**$3.75**
No. **1835**, Flat Side.................each	....	**3.80**	....
Capacity (oil)..........................oz.	1	4	8
Diameter Round Glass...........inches	1 5/16	2 9/16	2 5/16
Height, Maximum.............. .inches	5 11/16	5 9/16	8½

Lunkenheimer Bottle Oilers

Straight Blank Shank—Loose Wire Feed



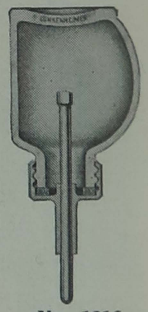
No. 1815
Globe Body

For use in ⅛-inch pipe tapped or 11/32-inch drilled holes.

For ¼ or ⅜-inch pipe tapped holes use metal adapters.

When distance from bottom of knurled base to surface of shaft is greater than 2⅞ inches, extra long loose wire feed is required.

Capacity, 4 ounces.

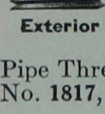


No. 1816
Flat Side Body

Size No.	*3	†3B
No. **1815**, Globe Body.....................each	**$1.50**	**$1.70**
No. **1816**, Flat Side Body.................each	**1.80**	**2.00**
Extra Long Wire Only.......................each	.....	**.25**

*Regular.
†Extra long.

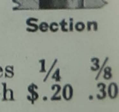
No. 1817 Metal Adapters



Exterior

Bearing oil holes which are too large for shank of oiler may be tapped ¼ or ⅜-inch pipe to receive metal adapters. Adapters drilled to receive oiler shank.

Furnished only when specified.



Section

Pipe Threaded...............................inches	¼	⅜
No. **1817**, For Nos. 3 and 3B Size Oilers.......each	**$.20**	**.30**

Extra Body Glasses

Size No. 28.

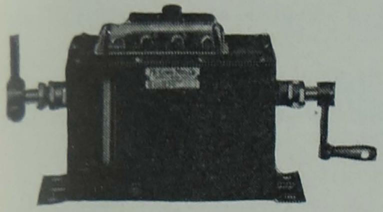
No. **1818**, for Nos. 3 and 3B Globe Bottle Oilers.each	**$.40**
No. **1819**, for Nos. 3 and 3B Flat Side Oilers.....each	**.60**

Extra Cork-Fiber Washers

No. **1814**, for Nos. 3 and 3B Size Oilers......per dozen	**$.44**

McCord Force Feed Lubricators

Class A



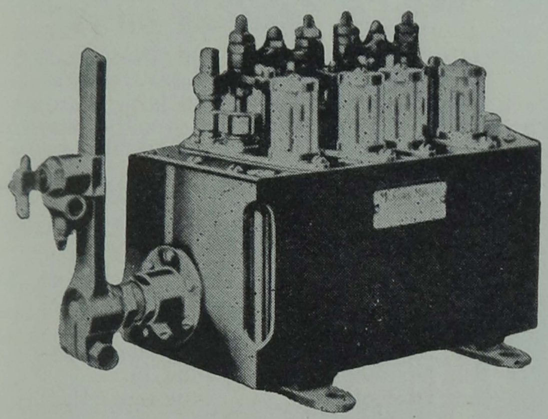
A compact efficient lubricator with positive sight feed enabling the operator to see the exact amount of oil forced to every lubrication point.

A dependable lubricator in any weather or in any viscosity of oil.

Tested against 500 pounds pressure. Finished in black enamel and brass.

Capacity..qts.	¾	2	2	2	2	4	4
Each.........	**$16.00**	**18.00**	**24.00**	**30.00**	**36.00**	**42.00**	**48.00**
Feeds........	1	1	2	3	4	5	6

Class B



A high grade dependable lubricator for gas, steam, Diesel engines, compressors or general lubricating requirements.

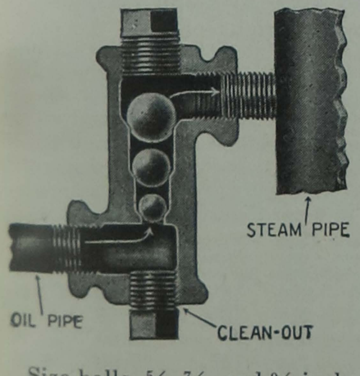
Accurate and dependable. The amount of oil delivered can be regulated from one drop to a constant stream. Each pump has individual adjustment and can be removed without disturbing the set or adjustment of the other pumps. Adjustment is simple and is made by thumb nuts on top of the delivery plunger.

All working parts are drop forged steel casehardened and operate in oil. Each pump is tested against 2000 pounds pressure. Drive may be from either end of pump.

All parts are interchangeable.

No.	Each	Cap. Qts.	Feeds	No.	Each	Cap. Gal.	Feeds	No.	Each	Cap. Gal.	Feeds
1	**$25.00**	1	1	**9**	**$45.00**	1	3	**17**	**$108.00**	2	11
2	**30.00**	1	2	**10**	**51.00**	1	4	**18**	**115.00**	2	12
3	**28.00**	2	1	**11**	**57.00**	1	5	**19**	**125.00**	2	13
4	**35.00**	2	2	**12**	**63.00**	1	6	**20**	**135.00**	2	14
5	**42.00**	2	3	**13**	**75.00**	1½	7	**60**	**145.00**	2½	15
6	**49.00**	2	4	**14**	**82.00**	1½	8	**61**	**155.00**	2½	16
7	**33.00**	4	1	**15**	**90.00**	1½	9	**62**	**165.00**	2½	17
8	**39.00**	4	2	**16**	**96.00**	1½	10	**63**	**175.00**	2½	18

McCullough Practical Triple Check Valves



For use in connection with force-feed pumps.

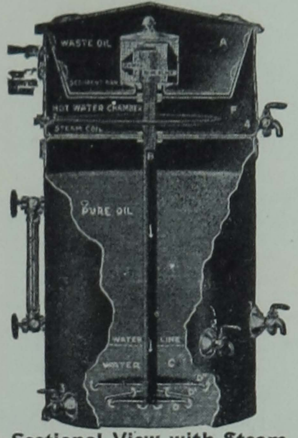
Simple in construction. Balls made of special metal; will not corrode, or pit. Keeps shape under tremendous heat. Each ball is provided with a special seat thus making 3 distinct checks in one body. Ball seats so constructed as to eliminate possibility of balls becoming wedged in.

To be used in a vertical position. Do not use next to an oil pump.

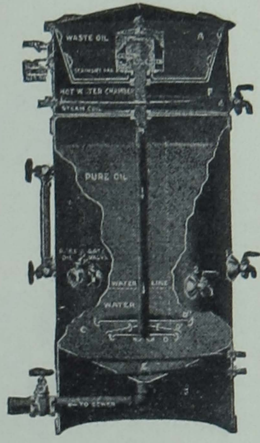
Size balls, 5/16, 7/16, and 9/16 inch.

Check Valves................................each **$1.25**

American Oil Filters



Sectional View with Steam and Hot Water Connection



Sectional View Fitted Up for Oiling Systems

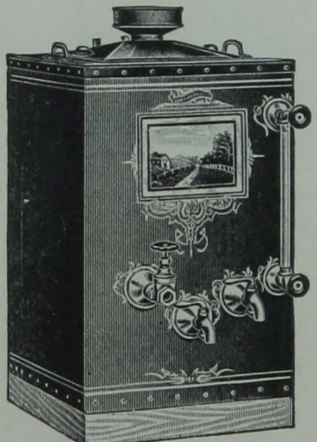
Recommended specially for cleaning lard, cylinder, crankcase and other grades of heavy oil. The hot water chamber at top surrounds the unfiltered oil and renders it thin and easy flowing. Adapted to the use of hot water from a gas engine for the purpose of heating the waste oil and facilitating its rapid filtration. Pipe connections can be made so that a continuous flow from cylinders can be had through the not water chamber.

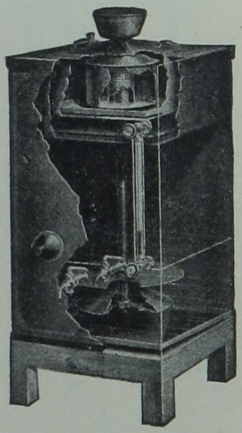
No.	Filtering Capacity *Gallons	Dirty Oil Capacity Gallons	Pure Oil Capacity Gallons	Diam. Inches	Price Each
1	20 to 30	7	15	18	**$37.00**
2	5 " 10	3	6	12	**25.00**
3	40 " 50	19	30	24	**75.00**
4	60 " 70	36	72	30	**90.00**
5	70 " 90	44	111	33	**110.00**
6	100 " 120	50	150	35	**130.00**

*Per day of 24 hours.

No. 10 Burt Unit Type Oil Filters

Small Size





This filter is designed especially for power plants.

The No. 10 Unit will be found to meet requirements, as it occupies a limited space, yet has a filtering capacity of from 100 to 150 gallons per 24 hours.

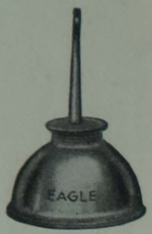
Filter can be used with or without an oiling system.

Size No.	Units	*Filtering Cap. Gal.	Chamber Cap., Gal. Pure Oil	Waste Oil	Water	Lgth. In.	Width In.	Ht. In.	Price Each
10	1	100 to 150	50	10	11	24	24	36	**$100.00**

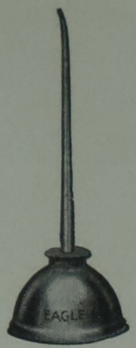
*Per day of 24 hours.

A round automatic water separator which is placed on top of filter at an extra cost of $27.00, can also be furnished.

Eagle Copper-Plated Steel Oilers



Straight Spout



Bent Spout

Made from high grade cold rolled steel, with guaranteed spring steel bottoms; seamless drawn steel bodies, collar included, all one piece; heavy rolled threads; bottoms double seamed; heavily electro copper-plated; 1⅜-inch wide mouth opening.

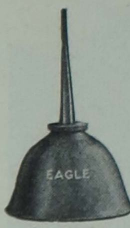
All spouts are interchangeable. Three and 5-inch spouts are straight; 9-inch spouts are bent. Reinforced insert spouts.

Packed one dozen in carton.

No.	Per Dozen	Extra Spouts Per Dozen	Capacity Pints	Length Spout Inches	Diameter at Bottom Inches	Height to Top of Collar Inches	Height Over All Inches
12	**$4.50**	**$2.75**	¼	3	2⅞	1⅞	5½
13	**5.50**	**2.75**	⅓	3	3½	2⅛	5⅝
13A	**6.00**	**3.25**	⅓	5	3½	2⅛	6¾
14	**6.50**	**4.25**	⅓	9	3½	2⅛	10⅝
14A	**7.50**	**2.75**	½	3	4	2⅝	6
14AA	**8.00**	**3.25**	½	5	4	2⅝	7¼
14B	**8.50**	**4.25**	½	9	4	2⅝	11¼
15	**9.25**	**2.75**	1	3	4 5/16	3¼	6⅞
15A	**9.75**	**3.25**	1	5	4 5/16	3¼	7¾
16	**10.50**	**4.25**	1	9	4 5/16	3¼	11⅞

Eagle Welded Steel Bench Oilers

With Machine Cut Threads



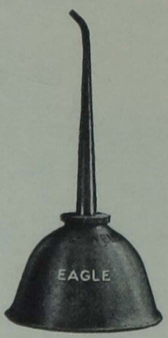
Straight Spout

Made of one piece of seamless steel without soldering; cannot leak. The neck is formed by turning the top of the body down and threading; neck is backed up by hard composition metal.

Bottom is welded to the body.

Spouts are welded and interchangeable and have solid brass bushings.

Packed one dozen in carton.

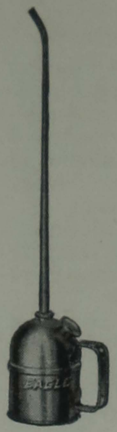


Bent Spout

No.	Per Dozen	Spouts Extra Per Dozen	Diameter Inches	Capacity Pint	Length Spouts Inches
2004	**$5.00**	**$2.75**	3⅜	⅓	4
2006	**5.50**	**3.30**	3⅜	⅓	6
2009	**6.00**	**3.90**	3⅜	⅓	9
2012	**6.50**	**4.45**	3⅜	⅓	12
3004	**6.00**	**2.75**	3¾	½	4
3006	**6.50**	**3.30**	3¾	½	6
3009	**7.00**	**3.90**	3¾	½	9
3012	**7.50**	**4.45**	3¾	½	12
4004	**7.00**	**2.75**	4⅛	¾	4
4006	**7.50**	**3.30**	4⅛	¾	6
4009	**8.00**	**3.90**	4⅛	¾	9
4012	**8.50**	**4.45**	4⅛	¾	12
5004	**8.00**	**2.75**	4½	1	4
5006	**8.50**	**3.30**	4½	1	6
5009	**9.00**	**3.90**	4½	1	9
5012	**9.50**	**4.45**	4½	1	12

Spouts 6 inches or longer are shipped bent unless ordered straight.

Eagle Copper-Plated Railroad Oilers



The body is a one-piece seamless shell. Handle is welded to body.

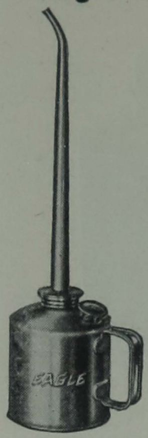
Welded steel spouts are interchangeable.

Made of high grade cold rolled steel; has solid brass spout bushings and cut threads.

Packed 6 in carton.

No.		**10**	**11**
Per Dozen		**$14.00**	**$18.00**
Extra Spouts	per dozen	**5.00**	**7.00**
Capacity	pints	1	2
Length Spout	inches	12	18
Diameter at Bottom	inches	3⅝	4¼
Height to Top of Collar	inches	4¾	5⅞
Height over All	inches	16⅝	23⅝
Weight per Dozen	pounds	9½	14¼

Eagle Extra Heavy Copper-Plated Steel Railroad Oilers

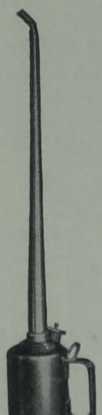


A solderless oiler for railroad and factory use. Has seamless welded steel reinforced insert type spout with large opening; reinforced handle welded to body; heavy precision rolled threads; vented filler cap.

No. 101 has beaded body with double seamed bottom; No. 111 bottom is acetylene welded to body. Spouts are interchangeable.

No.		**101**	**111**
Per Dozen		**$18.00**	**$20.00**
Extra Spouts	per dozen	**4.75**	**5.75**
Capacity	quarts	1	2
Length Spout	inches	10½	14½
Diameter Filler Opening	in.	1	1
Diameter	inches	4¼	5¼
Height to Top of Collar	in.	6	6¼
Weight per Dozen	pounds	14	20

Eagle Improved Welded Steel Valve Oilers



For use in mills, mines, factories, foundries, etc., where a gravity feed oiler is practical.

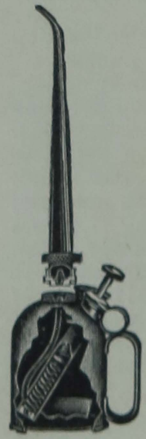
Welded construction throughout. Seamless spouts and bodies. Positive working valve 6 inches from top of spot. Bottom re-enforced with 16 gauge steel band, ½-inch wide, acetylene welded to body. Rust and oil-proof black finish.

Packed ½, 1 or 2 dozen in shipping carton.

Nos.		**400**	**450**
Per Dozen		**$15.00**	**18.00**
Capacity	qts.	1	1½
Length Spout	in.	22½	22½
Diameter	in.	4¼	4½
Height to Top of Body	in.	5¾	7¼
Height Overall	in.	28	29½
Diameter Filler Opening	in.	1	1
Diameter Spout Outlet	in.	3/16	3/16
Weight Per Dozen	lbs.	23	25

Eagle Force Feed Oilers

Polished Steel or Copper-Plated

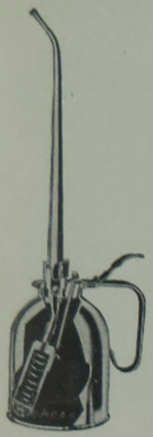


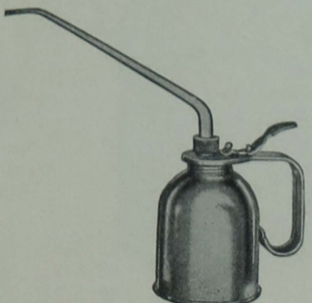
An improved upright oiler of the pump type which can be positively emptied and with which oil can be forced from the spout at any angle. Body is a seamless drawn shell of high grade cold rolled strip steel. The spout seam is welded and will not break open when bent. Diameter of filler opening is 1 1/16 inches. All spouts are interchangeable.

Packed 6 in a cardboard carton.

No.	Capacity Pints	Length Spout Inches	Diameter Inches	Weight Pounds per Dozen	Price, per Dozen Pol. Steel	Price, per Dozen Copper-Plated
710	1	10	3⅝	16½	**$24.00**	**$27.00**
712	1	12	3⅝	16¾	**24.50**	**27.50**
718	1	18	3⅝	19	**25.00**	**28.00**
910	2	10	4¼	19¾	**29.00**	**32.00**
912	2	12	4¼	20¾	**29.50**	**32.50**
918	2	18	4¼	21¼	**30.00**	**33.00**

Eagle Improved Hydraulic Pump Oilers





These oilers are for use by mechanics, millwrights, farmers and service station attendants. Used in mills, mines, factories and foundries for shafting, conveyors, presses, shop equipment, harvesting machinery, tractors, trucks, automobiles, and for all general machine shop use.

Constructed with seamless drawn steel bodies, genuine double seamed bottoms, and a welded steel spout with an extended steel thread protector. The steel spout is detachable.

Pumps any oil that will flow. Will deliver oil in a full stream or one drop under perfect control, the quantity controlled by the pressure exerted on the thumb lever. The position of the new type one-piece handle and the thumb lever enables the operator to force oil in any angle from any position with the least effort.

Oiler is coppered finish. Has brass couplings with machine cut threads, and a machined and ground brass plunger. Ball Valves.

Positive in its action, easy to operate and easy to clean.

With Upright Spouts

No.	Per Doz.	Cap. Pts.	Length Spout In.	Dia. In.	Height Over-All In.	Wt. Per Doz. Lbs.	Extra Spouts Per Doz.
27	$10.20	¾	6	3	10½	9⅝	$2.00
279	12.00	¾	9	3	13½	10⅜	2.50
28	16.20	1	9	3⅝	14¼	13¾	2.50
2815	18.00	1	15	3⅝	20½	14¾	3.00
29	22.20	2	9	4¼	15½	17	2.50
2915	24.00	2	15	4¼	21½	18	3.00

With 50° Angle Spouts

27A	$12.00	¾	6	3	7½	9⅝	$3.80
279A	13.80	¾	9	3	9	10⅜	4.30
28A	18.00	1	9	3⅝	10	13¾	4.30
2815A	19.80	1	15	3⅝	14	14¾	4.80
29A	24.00	2	9	4¼	11	17	4.30
2915A	25.80	2	15	4¼	15	18	4.80

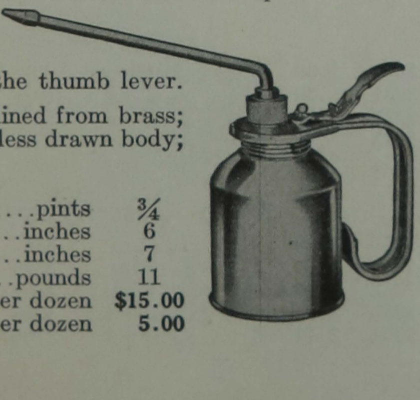
Packed 6 in a carton.

No. 2276 Eagle Duo Hydraulic Pump Oilers

Opening in cone-shaped nozzle is proper size to dispense light penetrating or heavier grade oil.

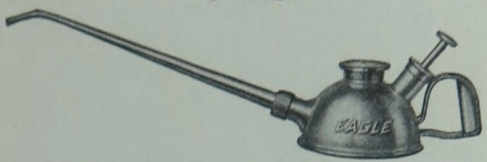
Oiler will pump a full stream or one drop at a time. Will throw oil 1 inch or 20 feet—distance determined by amount of energy exerted on the thumb lever.

Working parts machined from brass; coppered finish. Seamless drawn body; detachable spout.



Capacity................pints	¾
Length Spout...........inches	6
Height Over All.........inches	7
Weight, per Dozen.....pounds	11
No. 2276............per dozen	**$15.00**
Extra Spouts........per dozen	**5.00**

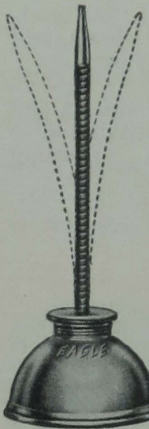
Eagle Copper Plated Automobile Pump Oilers



Has positive working pump by which the oil can be forced from spout opening at any position. Knurled cut thread brass spout coupling. Welded steel spouts. All sizes are interchangeable.

No.	**801**	**802**	**803**	**804**
Per Dozen	**$23.50**	**24.00**	**25.25**	**25.75**
Capacity.....pints	½	½	1	1
Length of Spout.....inches	5	9	5	9
Spout Extends from Can...inches	6⅛	10	6⅛	10
Outside Diameter.....inches	4	4	4⅜	4⅜

Eagle Flexible Spout Oilers



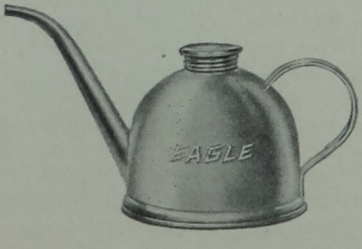
Has spring steel, double-seamed bottom. Seamless drawn steel body (collar included) all one piece. Heavy rolled threads. Has 1⅜-inch mouth opening.

Is heavily electro copper-plated.

The re-enforced insert type spout is made from asbestos lined rustless flexible steel tubing with metal tip.

No.	**13F**	**14F**	**15F**
Per Dozen	**$4.00**	**$4.45**	**$5.00**
Extra Spouts...per doz.	**2.90**	**2.90**	**2.90**
Capacity.........pints	⅓	½	1
Length Spout.......in.	8	8	8
Diam. Bottom......in.	3½	4	4$\frac{5}{16}$
Ht. to Top of Collar.in.	2⅛	2⅝	3¼
Ht. Over All........in.	9¾	10⅜	11⅛
Wt. per Doz.......lbs.	3⅝	4¾	6

Eagle Copper-Plated Engineers' Fillers



Made from high grade cold rolled steel, double seamed bottom; threaded filler cap and filler opening, 1½-inch opening.

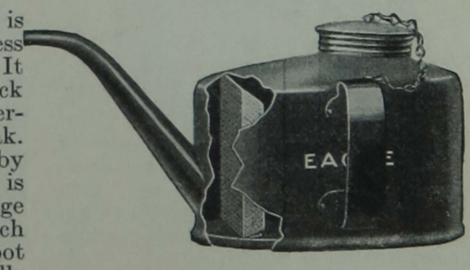
Spout seam is welded. Spout and handle welded to body.

Packed one-half dozen in carton.

No.	Per Dozen	Capacity Pints	Diameter Inches	Height Inches	Spout Length Inches	Diameter Spout Opening Inches
19	**$14.00**	1	4¼	3⅜	4⅜	¼
19A	**17.00**	1½	5¼	4½	6⅞	¼
210	**20.00**	2	5½	4¾	6⅞	¼
211	**24.00**	4	6⅜	5¾	6⅞	¼

No. 40 S. H. Eagle Welded Steel Tallow Pots

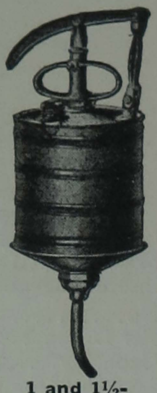
This tallow pot is made of seamless steel in one piece. It is finished in black enamel. It is solderless and cannot leak. It is unaffected by heat. The handle is made of 16 gauge steel and is one inch wide. The tallow pot has a side handle with strainer.



Capacity, 2 quarts. Size of bottom, 5$\frac{7}{16}$x7½ in. Length nozzle, 6⅞ in. Diameter nozzle opening, ⅜ in. Diameter filler opening, 2½ in. Height to top cap, 6½ in.

No. 40 S.H.............................per dozen **$15.00**

Tormay Pit Car Oilers



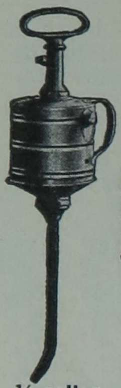
1 and 1½-gallon Size

The Tormay Oiler is used for mine car wheels and is also for use on general machinery motors, etc.

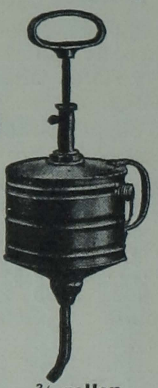
This oiler is designed for rough usage. It will operate in any position and discharge a given quantity of oil at one movement of the operating mechanism. The range of the movement is adjustable. No oil can escape except by a movement of the discharge plunger.

Cap. Gal.	Length of Nozzle Inches	Discharge at Each Operation Ounces	Weight Pounds Boxed	Price Each
1	5	1/20 to 1¼	10	$10.25
1½	5	¾ " 3½	13	13.50

Tormay Pit Car Oilers



½-gallon Size



¾-gallon Size

For oiling plain car wheels, and general miscellaneous purposes.

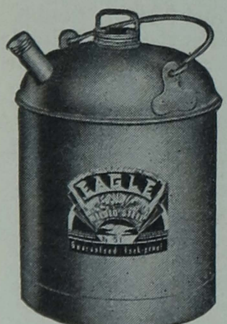
Will operate in any position and discharge a given quantity of oil at one movement of the operating mechanism.

The range of the movement is adjustable.

Cap. Gal.	Lgth. Nozzle In.	Discharge at Each Operation Oz.	Wt. Lbs. Boxed	Price Each
½	12	1/20 to 1¼	7	$8.00
¾	5	1/20 " 1¼	9	8.75

Eagle Welded Steel Cans

With Handy-Grip Caps



The body, as well as the dome, is drawn from one piece of 24-gage steel. Spout, collar and ears are all welded into place by same process.

The steel hoop around bottom is 1½ inches wide and extends ½ inch below the bottom, serving as a support for the entire weight of the can.

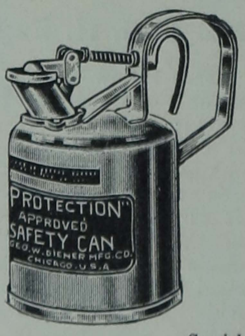
Height to top of cap 15⅞ inches; diameter of can 11¼ inches; diameter of spout 1¼ inches; capacity 5 gallons.

Packed 3 in heavy shipping carton.

Shipping weight 92 pounds.

No. 50, Red Enameled Gasoline Can......	per dozen	$30.00
No. 51, Blue Enameled Oil Can...........	per dozen	30.00

Diener Protection Safety Non-Explosive Cans

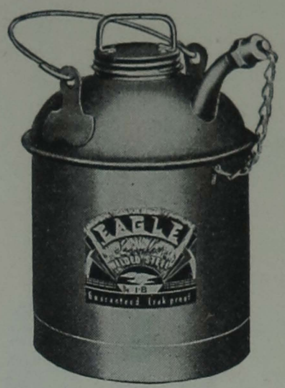


Tested, examined and labeled by Underwriters' Laboratories, Inc., and by the Associated Factory Mutual Fire Insurance Companies.

For proper handling of all volatile explosive liquids, such as gasoline, naphtha, ammonia, ether, etc. Can is provided with an automatic valve, which makes it airtight and prevents evaporation of liquid.

Capacity	Each	Special Funnels per Doz.	Capacity	Each	Special Funnels per Doz.
1 Pt.	$1.75	$1.50	2 Gal.	$3.50	$1.80
1 Qt.	2.00	1.50	3 Gal.	4.50	1.80
2 Qt.	2.50	1.80	5 Gal.	5.50	2.50
1 Gal.	3.00	1.80	10 Gal.	8.50	2.50

Eagle Welded Steel Gasoline Cans



For transporting small quantities of gas in trucks or service equipment.

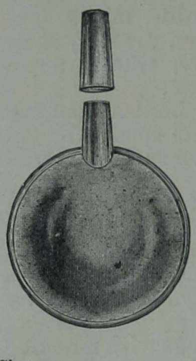
Body drawn from 24-gage steel; breast and body acetylene welded together. Bottom reinforced with heavy steel hoop. Spout and handle welded to can. Spout fitted with cut thread cap securely attached by chain welded to body.

Spout opening ½ inch. Filler opening 2¼ inches.

Red enamel finish.

No.	Per Doz.	Cap. Gal.	Diam. In.	No. in Carton	Wt. Lbs. per Doz.
1R	$20.00	1	6½	12	25
2R	25.00	2	8⅞	6	42

Steel Cadgers



A strong and durable carrier for miner's reserve oil supply. Made of heavy cold rolled steel, with double rolled side seam spelter brazed. Heavy tapered spout welded to body of cap, with tapered cap of same gauge, making tight joint without screw thread.

Cap easily removed.

Practically indestructible.

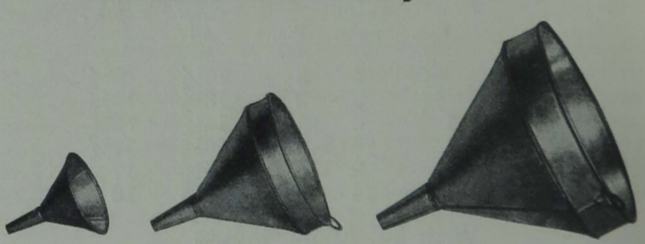
Will outlast half a dozen ordinary tin cadgers.

Fits the pocket.

Shipped in bulk.

Size Pints	Weight Ounces	Price per Gross
½	6	$36.00
1	8	60.00

Midland Extra Heavy Funnels



Rims of all funnels double seamed to breasts.

Spouts grooved to admit air.

Ring permits funnel to be hung up when not in use.

Heavy Steel

No.	Each	Diam. In.	Description	No.	Each	Diam. In.	Description
840	$.80	2¾	No Rim	845	$1.50	7	Rimmed
841	.80	3¼	No Rim	846	2.00	8	Rimmed
842	.90	4½	No Rim	847	2.40	9	Rimmed
843	.90	5	Rimmed	848	2.80	10	Rimmed
844	1.20	6	Rimmed	849	3.20	12	Rimmed

Heavy 4X Tin

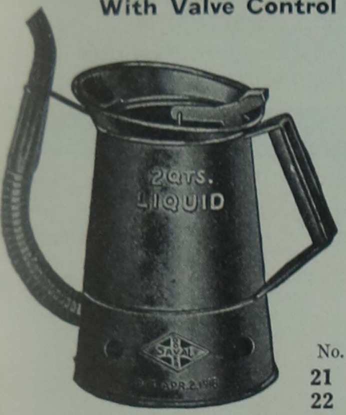
No.	Each	Diam. In.	Description	No.	Each	Diam. In.	Description
3930	$.80	2¾	No Rim	3935	$1.50	7	Rimmed
3931	.80	3¼	No Rim	3936	2.00	8	Rimmed
3932	.90	4½	No Rim	3937	2.40	9	Rimmed
3933	.90	5	Rimmed	3938	2.80	10	Rimmed
3934	1.20	6	Rimmed	3939	3.20	12	Rimmed

Heavy Copper—Tinned Inside

No.	Each	Diam. In.	Description	No.	Each	Diam. In.	Description
3350	$1.20	2¾	No Rim	3355	$3.00	7	Rimmed
3351	1.40	3¼	No Rim	3356	4.00	8	Rimmed
3352	1.60	4½	No Rim	3357	4.80	9	Rimmed
3353	2.00	5	Rimmed	3358	5.60	10	Rimmed
3354	2.40	6	Rimmed	3359	6.40	12	Rimmed

Dover Saval Liquid Oil Measures

With Valve Control and Oil Straining Device



Made of steel, copper-plated, polished and lacquered.

Pushing thumb lever down and pulling back with thumb locks valve open; pushing thumb lever forward and releasing closes valve.

Diameter of top, 6 inches. Unit package, 6.

No.	Each	Cap. Qts.	Diam. Bottom In.	Ht. In.	Wt. Lbs. per Doz.
21	**$3.26**	1	6¼	7⅛	15
22	**3.92**	2	6⅝	9½	20
24	**4.92**	4	7¼	12½	25

Dover Combination Measures and Funnels

Plain Tin

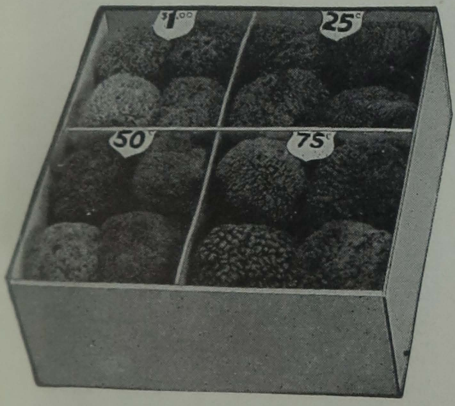
QUALITY WARE
DOVER
MADE IN NEW ENGLAND

All seams are soldered oil tight. Has back lip.

Correct capacity and approved by all the sealers of the various states.

No.	Cap. Qt.	Diam. Bot. In.	Total Hgt. In.	Diam. Spout In.	Unit Pkg. Dozen	Unit Pkg. Wt., Lbs.	Price Each
01½	½	3½	6	5/16	1	5	**$.80**
01	1	4	8	⅝	1	15	**.94**
02	2	5	10¼	⅝	1	20	**1.16**
04	4	6½	12⅛	⅞	1	25	**1.40**

Sponge Assortments

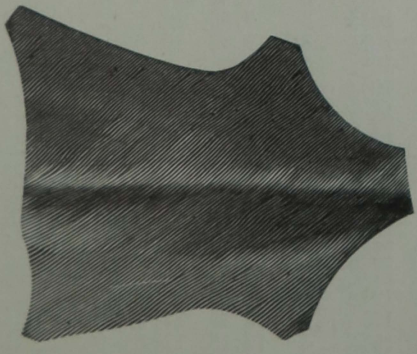


Assortment consists of 8 pieces each of the following grades of sponges:

Solid grass, soft yellow, soft velvet, and fine wool.

Price, Assortment of 32 Pieces..................each **$20.00**

Chamois Skins



No.	11	14	15	16
Size.......................in.	14x25½	17x30	18x31	25x32

Prices upon application.

Waste

White Cotton Waste

For wiping machinery, rubbing furniture and general cleaning purposes.

No....................................	1	2	3
Price.......................per pound	...	...	...

Furnished in 10, 25, 50 and 100-pound bales.

Colored Cotton Waste

No....................................	1	2	3
Price.......................per pound	...	...	...

Furnished in 10, 25, 50 and 100-pound bales.

Wool Waste

Skein yarn, long fiber or railroad specifications wool waste for packing purposes or with short fiber commercial wool for general lubrication can be supplied.

No....................................	1	2	3
Price, Colored..............per pound	...	...	...

Furnished in 100 or 500-pound bales.

Wiping Rags

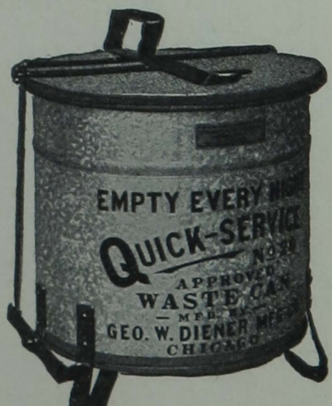
These rags are thoroughly washed and sterilized.

Packed in 50, 100 and 500-pound bales.

Price, Selected White ....per pound ....

Price, Selected Colored ....per pound ....

Diener Quick-Service Foot-Operated Oily Waste Cans



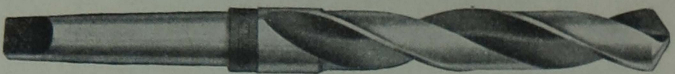
Made of heavy galvanized iron with simple self-closing tight-hinged cover, no springs. Has heavy band iron legs, securely riveted, raising body of can 4 inches from the floor.

Tested, examined and labeled by Underwriters' Laboratories, Inc., to be in accordance with the requirements of the National Board of Fire Underwriters and the Associated Factory Mutual Fire Insurance Companies.

No.	Each	Diam. In.	Ht. In.	Cap. Gal.	*Wt. Lbs. Crated Each
10	**$4.00**	11½	12	6	16
20	**5.50**	14¼	14	10	21
30	**7.00**	16	17	15	30
40	**10.00**	18½	20	25	43

Nos. 10, 20 and 30 are shipped 6 in a crate.
No. 40 is shipped 3 in a crate.
*Shipping weights approximate 1 can as crated.

No. 106 Cleveland Carbon Steel Taper Shank Twist Drills

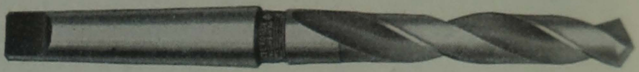


Diam. Inches	Decimal Equivalent	Lgth. Over All In.	Taper Shank No.	Each	Diam. Inches	Decimal Equivalent	Lgth Over All In.	Taper Shank No.	Each
1/8	.125	5 1/8	1	$.45	1 15/64	1.2343	12 1/2	3	$5.50
9/64	.1406	5 3/8	1	.45	1 1/4	1.25	12 1/2	3	5.50
5/32	.1562	5 3/8	1	.45	1 17/64	1.2656	14 1/8	4	5.75
11/64	.1718	5 3/4	1	.50	1 9/32	1.2812	14 1/8	4	5.75
3/16	.1875	5 3/4	1	.50	1 19/64	1.2968	14 1/4	4	6.00
13/64	.2031	6	1	.55	1 5/16	1.3125	14 1/4	4	6.00
7/32	.2187	6	1	.55	1 21/64	1.3281	14 3/8	4	6.25
15/64	.2343	6 1/8	1	.60	1 11/32	1.3437	14 3/8	4	6.25
1/4	.25	6 1/8	1	.60	1 23/64	1.3593	14 1/2	4	6.50
17/64	.2656	6 1/4	1	.65	1 3/8	1.375	14 1/2	4	6.50
9/32	.2812	6 1/4	1	.65	1 25/64	1.3906	14 5/8	4	7.00
19/64	.2968	6 3/8	1	.70	1 13/32	1.4062	14 5/8	4	7.00
5/16	.3125	6 3/8	1	.70	1 27/64	1.4218	14 3/4	4	7.50
21/64	.3281	6 1/2	1	.75	1 7/16	1.4375	14 3/4	4	7.50
11/32	.3437	6 1/2	1	.75	1 29/64	1.4531	14 7/8	4	8.00
23/64	.3593	6 3/4	1	.80	1 15/32	1.4687	14 7/8	4	8.00
3/8	.375	6 3/4	1	.80	1 31/64	1.4843	15	4	8.50
25/64	.3906	7	1	.90	1 1/2	1.5	15	4	8.50
13/32	.4062	7	1	.90	1 33/64	1.5156	15	4	9.00
27/64	.4218	7 1/4	1	1.00	1 17/32	1.5312	15	4	9.00
7/16	.4375	7 1/4	1	1.00	1 35/64	1.5468	15 1/4	4	9.50
29/64	.4531	7 1/2	1	1.10	1 9/16	1.5625	15 1/4	4	9.50
15/32	.4687	7 1/2	1	1.10	1 37/64	1.5781	15 1/2	4	10.00
31/64	.4843	7 3/4	1	1.20	1 19/32	1.5937	15 1/2	4	10.00
1/2	.5	7 3/4	1	1.20	1 39/64	1.6093	15 5/8	4	10.50
33/64	.5156	8	1	1.30	1 5/8	1.625	15 5/8	4	10.50
17/32	.5312	8	1	1.30	1 41/64	1.6406	15 3/4	4	11.00
35/64	.5468	8 1/4	1	1.40	1 21/32	1.6562	15 3/4	4	11.00
9/16	.5625	8 1/4	1	1.40	1 43/64	1.6718	15 3/4	4	11.50
37/64	.5781	8 3/4	2	1.50	1 11/16	1.6875	15 3/4	4	11.50
19/32	.5937	8 3/4	2	1.50	1 45/64	1.7031	15 3/4	4	12.00
39/64	.6093	8 3/4	2	1.60	1 23/32	1.7187	15 3/4	4	12.00
5/8	.625	8 3/4	2	1.60	1 47/64	1.7343	16 1/4	4	12.50
41/64	.6406	9	2	1.70	1 3/4	1.75	16 1/4	4	12.50
21/32	.6562	9	2	1.70	1 25/32	1.7812	16 1/4	4	13.25
43/64	.6718	9 1/4	2	1.80	1 13/16	1.8125	16 1/4	4	14.00
11/16	.6875	9 1/4	2	1.80	1 27/32	1.8437	16 3/8	4	14.75
45/64	.7031	9 1/2	2	1.90	1 7/8	1.875	16 1/2	4	15.50
23/32	.7187	9 1/2	2	1.90	1 29/32	1.9062	16 1/2	4	16.25
47/64	.7343	9 3/4	2	2.00	1 15/16	1.9375	16 5/8	4	17.00
3/4	.75	9 3/4	2	2.00	1 31/32	1.9687	16 5/8	4	17.75
49/64	.7656	9 7/8	2	2.10	2	2.	16 5/8	4	18.50
25/32	.7812	9 7/8	2	2.10	2 1/32	2.0312	17 3/8	5	19.25
51/64	.7968	10	2	2.20	2 1/16	2.0625	17 3/8	5	20.00
13/16	.8125	10	2	2.20	2 3/32	2.0937	17 3/8	5	20.75
53/64	.8281	10	2	2.40	2 1/8	2.125	17 3/8	5	21.50
27/32	.8437	10	2	2.40	2 5/32	2.1562	17 3/8	5	22.25
55/64	.8593	10	2	2.60	2 3/16	2.1875	17 3/8	5	23.00
7/8	.875	10	2	2.60	2 7/32	2.2187	17 3/8	5	23.75
57/64	.8906	10	2	2.80	2 1/4	2.25	17 3/8	5	24.50
29/32	.9062	10	2	2.80	2 5/16	2.3125	17 3/8	5	26.00
59/64	.9218	10 3/4	3	3.00	2 3/8	2.375	17 3/8	5	27.50
15/16	.9375	10 3/4	3	3.00	2 7/16	2.4375	18 3/4	5	29.00
61/64	.9531	11	3	3.25	2 1/2	2.5	18 3/4	5	30.50
31/32	.9687	11	3	3.25	2 9/16	2.5625	19 1/2	5	32.00
63/64	.9843	11	3	3.50	2 5/8	2.625	19 1/2	5	34.00
1	1.	11	3	3.50	2 11/16	2.6875	20 3/8	5	36.00
1 1/64	1.0156	11 1/8	3	3.75	2 3/4	2.75	20 3/8	5	38.00
1 1/32	1.0312	11 1/8	3	3.75	2 13/16	2.8125	21 1/8	5	40.50
1 3/64	1.0468	11 1/4	3	4.00	2 7/8	2.875	21 1/8	5	43.00
1 1/16	1.0625	11 1/4	3	4.00	2 15/16	2.9375	21 3/4	5	45.50
1 5/64	1.0781	11 1/2	3	4.25	3	3.	21 3/4	5	48.00
1 3/32	1.0937	11 1/2	3	4.25	*3 1/16	3.0625	24 7/16	6	57.75
1 7/64	1.1093	11 3/4	3	4.50	*3 1/8	3.125	24 7/16	6	62.25
1 1/8	1.125	11 3/4	3	4.50	*3 3/16	3.1875	24 7/16	6	66.75
1 9/64	1.1406	11 7/8	3	4.75	*3 1/4	3.25	25 7/16	6	72.00
1 5/32	1.1562	11 7/8	3	4.75	*3 5/16	3.3125	25 7/16	6	77.50
1 11/64	1.1718	12	3	5.00	*3 3/8	3.375	25 7/16	6	83.00
1 3/16	1.1875	12	3	5.00	*3 7/16	3.4375	25 7/16	6	88.50
1 13/64	1.2031	12 1/8	3	5.25	*3 1/2	3.5	26 7/16	6	94.00
1 7/32	1.2187	12 1/8	3	5.25	.....	......	....	.	.....

*Furnished with No. 5 taper shank at slightly lower price.

Cleveland Cle-Forge High Speed Taper Shank Twist Drills

No. 940, Shanks Regular
No. 941, Shanks Smaller than Regular
No. 942, Shanks Larger than Regular



Shanks larger than 3-inch will be furnished with No. 5 taper shank at regular prices.

No. 940, shanks regular, will be supplied unless otherwise specified.

	No. 940			No. 941			No. 942		
Diam. Inches	Each	Length Overall Inches	Shank Taper No.	Each	Length Overall Inches	Shank Taper No.	Each	Length Overall Inches	Shank Taper No.
1/8	$1.00	5 1/8	1	....	....	...	....	....	...
9/64	1.10	5 3/8	1	....	....	...	....	....	...
5/32	1.10	5 3/8	1	....	....	...	....	....	...
11/64	1.25	5 3/4	1	....	....	...	....	....	...
3/16	1.25	5 3/4	1	....	....	...	....	....	...
13/64	1.35	6	1	....	....	...	....	....	...
7/32	1.35	6	1	....	....	...	....	....	...
15/64	1.40	6 1/8	1	....	....	...	....	....	...
1/4	1.40	6 1/8	1	....	....	...	....	....	...
17/64	1.50	6 1/4	1	....	....	...	....	....	...
9/32	1.50	6 1/4	1	....	....	...	....	....	...
19/64	1.60	6 3/8	1	....	....	...	....	....	...
5/16	1.60	6 3/8	1	....	....	...	....	....	...
21/64	1.70	6 1/2	1	....	....	...	....	....	...
11/32	1.70	6 1/2	1	....	....	...	....	....	...
23/64	1.90	6 3/4	1	....	....	...	....	....	...
3/8	1.90	6 3/4	1	....	....	...	$2.10	7 3/8	2
25/64	2.10	7	1	....	....	...	2.25	7 1/2	2
13/32	2.10	7	1	....	....	...	2.25	7 1/2	2
27/64	2.30	7 1/4	1	....	....	...	2.45	7 3/4	2
7/16	2.30	7 1/4	1	....	....	...	2.45	7 3/4	2
29/64	2.50	7 1/2	1	....	....	...	2.65	8	2
15/32	2.50	7 1/2	1	....	....	...	2.65	8	2
31/64	2.95	8 1/4	2	$2.75	7 3/4	1	....	....	...
1/2	2.95	8 1/4	2	2.75	7 3/4	1	....	....	...
33/64	3.25	8 1/2	2	3.05	8	1	....	....	...
17/32	3.25	8 1/2	2	3.05	8	1	....	....	...
35/64	3.75	8 3/4	2	3.50	8 1/4	1	....	....	...
9/16	3.75	8 3/4	2	3.50	8 1/4	1	....	....	...
37/64	4.00	8 3/4	2	....	....	...	....	....	...
19/32	4.00	8 3/4	2	....	....	...	....	....	...
39/64	4.25	8 3/4	2	....	....	...	....	....	...
5/8	4.25	8 3/4	2	....	....	...	....	....	...
41/64	4.75	9	2	....	....	...	$5.15	9 3/4	3
21/32	4.75	9	2	....	....	...	5.15	9 3/4	3
43/64	5.25	9 1/4	2	....	....	...	5.70	10	3
11/16	5.25	9 1/4	2	....	....	...	5.70	10	3
45/64	5.75	9 1/2	2	....	....	...	6.20	10 1/4	3
23/32	5.75	9 1/2	2	....	....	...	6.20	10 1/4	3
47/64	6.25	9 3/4	2	....	....	...	6.75	10 1/2	3
3/4	6.25	9 3/4	2	....	....	...	6.75	10 1/2	3
49/64	6.50	9 7/8	2	....	....	...	7.00	10 5/8	3
25/32	6.50	9 7/8	2	....	....	...	7.00	10 5/8	3
51/64	7.25	10 3/4	3	$6.75	10	2	....	....	...
13/16	7.25	10 3/4	3	6.75	10	2	....	....	...
53/64	7.65	10 3/4	3	7.15	10	2	....	....	...
27/32	7.65	10 3/4	3	7.15	10	2	....	....	...
55/64	8.05	10 3/4	3	7.50	10	2	....	....	...
7/8	8.05	10 3/4	3	7.50	10	2	....	....	...
57/64	8.45	10 3/4	3	7.85	10	2	....	....	...
29/32	8.45	10 3/4	3	7.85	10	2	....	....	...
59/64	8.85	10 3/4	3	....	....	...	....	....	...
15/16	8.85	10 3/4	3	....	....	...	....	....	...
61/64	9.65	11	3	....	....	...	....	....	...
31/32	9.65	11	3	....	....	...	....	....	...
63/64	10.25	11	3	....	....	...	....	....	...
1	10.25	11	3	....	....	...	$11.20	12	4
1 1/64	11.00	11 1/8	3	....	....	...	12.00	12 1/8	4
1 1/32	11.00	11 1/8	3	....	....	...	12.00	12 1/8	4
1 3/64	11.75	11 1/4	3	....	....	...	12.80	12 1/4	4
1 1/16	11.75	11 1/4	3	....	....	...	12.80	12 1/4	4
1 5/64	13.25	12 1/2	4	$12.20	11 1/2	3	....	....	...
1 3/32	13.25	12 1/2	4	12.20	11 1/2	3	....	....	...
1 7/64	14.25	12 3/4	4	13.15	11 3/4	3	....	....	...
1 1/8	14.25	12 3/4	4	13.15	11 3/4	3	....	....	...
1 9/64	15.00	12 7/8	4	13.85	11 7/8	3	....	....	...
1 5/32	15.00	12 7/8	4	13.85	11 7/8	3	....	....	...

Cleveland Cle-Forge High Speed Taper Shank Twist Drills

Continued

No. 940, Shanks Regular

No. 941, Shanks Smaller than Regular

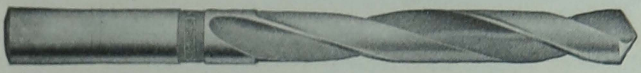
No. 942 drills not made larger than 1 1/16-inch.

	No. 940			No. 941		
Diam. Inches	Each	Length Overall Inches	Shank Taper No.	Each	Length Overall Inches	Shank Taper No.
1 11/64	**$15.75**	13	4	**$14.55**	12	3
1 3/16	**15.75**	13	4	**14.55**	12	3
1 13/64	**16.50**	13 1/8	4	**15.25**	12 1/8	3
1 7/32	**16.50**	13 1/8	4	**15.25**	12 1/8	3
1 15/64	**18.00**	13 1/2	4	**16.65**	12 1/2	3
1 1/4	**18.00**	13 1/2	4	**16.65**	12 1/2	3
1 17/64	**20.00**	14 1/8	4	.....	....	...
1 9/32	**20.00**	14 1/8	4	.....	....	...
1 19/64	**20.75**	14 1/4	4	.....	....	...
1 5/16	**20.75**	14 1/4	4	.....	....	...
1 21/64	**21.50**	14 3/8	4	.....	....	...
1 11/32	**21.50**	14 3/8	4	.....	....	...
1 23/64	**22.25**	14 1/2	4	.....	....	...
1 3/8	**22.25**	14 1/2	4	.....	....	...
1 25/64	**23.00**	14 5/8	4	.....	....	...
1 13/32	**23.00**	14 5/8	4	.....	....	...
1 27/64	**23.75**	14 3/4	4	.....	....	...
1 7/16	**23.75**	14 3/4	4	.....	....	...
1 29/64	**24.50**	14 7/8	4	.....	....	...
1 15/32	**24.50**	14 7/8	4	.....	....	...
1 31/64	**25.25**	15	4	.....	....	...
1 1/2	**25.25**	15	4	.....	....	...
1 33/64	**28.75**	16 3/8	5	**$26.35**	15	4
1 17/32	**28.75**	16 3/8	5	**26.35**	15	4
1 35/64	**30.75**	16 5/8	5	**28.20**	15 1/4	4
1 9/16	**30.75**	16 5/8	5	**28.20**	15 1/4	4
1 37/64	**32.75**	16 7/8	5	**30.10**	15 1/2	4
1 19/32	**32.75**	16 7/8	5	**30.10**	15 1/2	4
1 39/64	**34.00**	17	5	**31.25**	15 5/8	4
1 5/8	**34.00**	17	5	**31.25**	15 5/8	4
1 41/64	**35.25**	17 1/8	5	**32.40**	15 3/4	4
1 21/32	**35.25**	17 1/8	5	**32.40**	15 3/4	4
1 43/64	**36.50**	17 1/8	5	**33.55**	15 3/4	4
1 11/16	**36.50**	17 1/8	5	**33.55**	15 3/4	4
1 45/64	**37.75**	17 1/8	5	**34.70**	15 3/4	4
1 23/32	**37.75**	17 1/8	5	**34.70**	15 3/4	4
1 47/64	**39.00**	17 1/8	5	**37.00**	16 1/4	4
1 3/4	**39.00**	17 1/8	5	**37.00**	16 1/4	4
1 25/32	**40.25**	17 1/8	5	**38.20**	16 1/4	4
1 13/16	**41.50**	17 1/8	5	**39.40**	16 1/4	4
1 27/32	**42.75**	17 1/8	5	**40.55**	16 1/4	4
1 7/8	**45.00**	17 3/8	5	**42.75**	16 1/2	4
1 29/32	**46.25**	17 3/8	5	**43.95**	16 1/2	4
1 15/16	**47.50**	17 3/8	5	**45.45**	16 5/8	4
1 31/32	**48.75**	17 3/8	5	**46.65**	16 5/8	4
2	**50.00**	17 3/8	5	**47.85**	16 5/8	4
2 1/32	**51.75**	17 3/8	5	.....	....	...
2 1/16	**53.50**	17 3/8	5	.....	....	...
2 3/32	**55.25**	17 3/8	5	.....	....	...
2 1/8	**57.00**	17 3/8	5	.....	....	...
2 5/32	**58.75**	17 3/8	5	.....	....	...
2 3/16	**60.50**	17 3/8	5	.....	....	...
2 7/32	**62.25**	17 3/8	5	.....	....	...
2 1/4	**64.00**	17 3/8	5	.....	....	...
2 5/16	**67.50**	17 3/8	5	.....	....	...
2 3/8	**71.00**	17 3/8	5	.....	....	...
2 7/16	**87.50**	18 3/4	5	.....	....	...
2 1/2	**91.00**	18 3/4	5	.....	....	...
2 9/16	**100.00**	19 1/2	5	.....	....	...
2 5/8	**105.00**	19 1/2	5	.....	....	...
2 11/16	**115.50**	20 3/8	5	.....	....	...
2 3/4	**120.50**	20 3/8	5	.....	....	...
2 13/16	**129.50**	21 1/8	5	.....	....	...
2 7/8	**135.00**	21 1/8	5	.....	....	...
2 15/16	**142.50**	21 3/4	5	.....	....	...
3	**150.00**	21 3/4	5	.....	....	...
3 1/16	**178.00**	24 7/16	6	**160.00**	22	5
3 1/8	**189.00**	24 7/16	6	**170.00**	22	5
3 3/16	**200.00**	24 7/16	6	**180.00**	22	5
3 1/4	**216.00**	25 7/16	6	**195.00**	23	5
3 5/16	**232.00**	25 7/16	6	**210.00**	23	5
3 3/8	**249.00**	25 7/16	6	**225.00**	23	5
3 7/16	**266.00**	25 7/16	6	**240.00**	23	5
3 1/2	**287.00**	26 7/16	6	**260.00**	24	5

Cleveland Straight Shank Twist Drills

Long Set

No. 110, Carbon Steel



No. 950, Cle-Forge High Speed Steel

Diam. Inches	Carbon Each	High Speed Each	Length Overall Inches	Diam. Inches	Carbon Each	High Speed Each	Length Overall Inches
1/8	**$.45**	**$1.00**	5 1/8	53/64	**$2.40**	**$7.15**	10
9/64	**.45**	**1.10**	5 3/8	27/32	**2.40**	**7.15**	10
5/32	**.45**	**1.10**	5 3/8	55/64	**2.60**	**7.50**	10
11/64	**.50**	**1.25**	5 3/4	7/8	**2.60**	**7.50**	10
3/16	**.50**	**1.25**	5 3/4	57/64	**2.80**	**7.85**	10
13/64	**.55**	**1.35**	6	29/32	**2.80**	**7.85**	10
7/32	**.55**	**1.35**	6	59/64	**3.00**	**8.85**	10 3/4
15/64	**.60**	**1.40**	6 1/8	15/16	**3.00**	**8.85**	10 3/4
1/4	**.60**	**1.40**	6 1/8	61/64	**3.25**	**9.65**	11
17/64	**.65**	**1.50**	6 1/4	31/32	**3.25**	**9.65**	11
9/32	**.65**	**1.50**	6 1/4	63/64	**3.50**	**10.25**	11
19/64	**.70**	**1.60**	6 3/8	1	**3.50**	**10.25**	11
5/16	**.70**	**1.60**	6 3/8	1 1/64	**3.75**	**11.00**	11 1/8
21/64	**.75**	**1.70**	6 1/2	1 1/32	**3.75**	**11.00**	11 1/8
11/32	**.75**	**1.70**	6 1/2	1 3/64	**4.00**	**11.75**	11 1/4
23/64	**.80**	**1.90**	6 3/4	1 1/16	**4.00**	**11.75**	11 1/4
3/8	**.80**	**1.90**	6 3/4	1 5/64	**4.25**	**12.20**	11 1/2
25/64	**.90**	**2.10**	7	1 3/32	**4.25**	**12.20**	11 1/2
13/32	**.90**	**2.10**	7	1 7/64	**4.50**	**13.15**	11 3/4
27/64	**1.00**	**2.30**	7 1/4	1 1/8	**4.50**	**13.15**	11 3/4
7/16	**1.00**	**2.30**	7 1/4	1 9/64	**4.75**	**13.85**	11 7/8
29/64	**1.10**	**2.50**	7 1/2	1 5/32	**4.75**	**13.85**	11 7/8
15/32	**1.10**	**2.50**	7 1/2	1 11/64	**5.00**	**14.55**	12
31/64	**1.20**	**2.75**	7 3/4	1 3/16	**5.00**	**14.55**	12
1/2	**1.20**	**2.75**	7 3/4	1 13/64	**5.25**	**15.25**	12 1/8
33/64	**1.30**	**3.05**	8	1 7/32	**5.25**	**15.25**	12 1/8
17/32	**1.30**	**3.05**	8	1 15/64	**5.50**	**16.65**	12 1/2
35/64	**1.40**	**3.50**	8 1/4	1 1/4	**5.50**	**16.65**	12 1/2
9/16	**1.40**	**3.50**	8 1/4	1 9/32	**5.75**	**20.00**	14 1/8
37/64	**1.50**	**4.00**	8 3/4	1 5/16	**6.00**	**20.75**	14 1/4
19/32	**1.50**	**4.00**	8 3/4	1 11/32	**6.25**	**21.50**	14 3/8
39/64	**1.60**	**4.25**	8 3/4	1 3/8	**6.50**	**22.25**	14 1/2
5/8	**1.60**	**4.25**	8 3/4	1 13/32	**7.00**	**23.00**	14 5/8
41/64	**1.70**	**4.75**	9	1 7/16	**7.50**	**23.75**	14 3/4
21/32	**1.70**	**4.75**	9	1 15/32	**8.00**	**24.50**	14 7/8
43/64	**1.80**	**5.25**	9 1/4	1 1/2	**8.50**	**25.25**	15
11/16	**1.80**	**5.25**	9 1/4	1 9/16	**9.50**	**28.20**	15 1/4
45/64	**1.90**	**5.75**	9 1/2	1 5/8	**10.50**	**31.25**	15 5/8
23/32	**1.90**	**5.75**	9 1/2	1 11/16	**11.50**	**33.55**	15 3/4
47/64	**2.00**	**6.25**	9 3/4	1 3/4	**12.50**	**37.00**	16 1/4
3/4	**2.00**	**6.25**	9 3/4	1 13/16	**14.00**	**39.40**	16 1/4
49/64	**2.10**	**6.50**	9 7/8	1 7/8	**15.50**	**42.75**	16 1/2
25/32	**2.10**	**6.50**	9 7/8	1 15/16	**17.00**	**45.45**	16 5/8
51/64	**2.20**	**6.75**	10	2	**18.50**	**47.85**	16 5/8
13/16	**2.20**	**6.75**	10	.....	.....	.....	....

Cleveland Bonding Drills

No. 95, Carbon Steel **No. 944, High Speed Steel**

No. 95

These drills are especially designed and tempered for drilling holes for bonding wires in track circuit signal work. For high carbon rails the high speed drill is recommended.

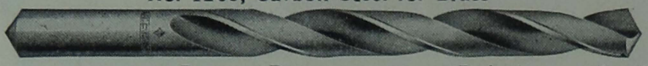
				Price, per Dozen	
Diam. Inches	Shank Diam. Inches	Length Flute Inches	Length Over All Inches	Carbon Steel	High Speed Steel
9/32	9/32	1 3/4	3	**$3.80**	**$7.00**
3/8	9/32	1 3/4	3	**6.00**	**11.00**
3/8	3/8	1 3/4	3	**6.00**	**11.00**

Cleveland Straight Shank Twist Drills

Short Set

No. 108, Carbon Steel No. 917, High Speed Steel

No. 1208, Carbon Steel for Brass

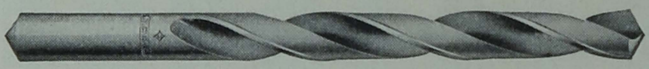


Diam. Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed Steel	Decimal Equivalent	Length Over All Inches
1/64	$1.50	$4.25	.0156	7/8
1/32	1.50	3.50	.0313	1 1/2
3/64	1.55	2.40	.0469	1 3/4
1/16	1.60	3.00	.0625	2 1/2
5/64	1.65	3.10	.0781	2 5/8
3/32	1.70	3.20	.0937	2 3/4
7/64	1.75	3.40	.1093	2 7/8
1/8	1.80	3.60	.1250	3
9/64	1.85	3.90	.1406	3 1/8
5/32	1.90	4.20	.1562	3 1/4
11/64	2.00	4.50	.1719	3 3/8
3/16	2.25	4.85	.1875	3 1/2
13/64	2.50	5.25	.2031	3 5/8
7/32	2.75	5.75	.2187	3 3/4
15/64	3.00	6.25	.2344	3 7/8
1/4	3.25	6.75	.2500	4
17/64	3.50	7.50	.2656	4 1/8
9/32	3.80	8.25	.2812	4 1/4
19/64	4.00	9.00	.2968	4 3/8
5/16	4.35	9.75	.3125	4 1/2
21/64	4.70	10.75	.3281	4 5/8
11/32	5.05	11.75	.3437	4 3/4
23/64	5.50	12.75	.3594	4 7/8
3/8	6.00	13.75	.3750	5
25/64	6.50	15.00	.3906	5 1/8
13/32	7.00	16.25	.4062	5 1/4
27/64	7.75	17.50	.4219	5 3/8
7/16	8.50	18.75	.4375	5 1/2
29/64	9.25	20.00	.4531	5 5/8
15/32	10.00	21.25	.4687	5 3/4
31/64	11.00	22.75	.4843	5 7/8
1/2	12.00	24.25	.5000	6

Cleveland Straight Shank Twist Drills

Letter Size

No. 109, Carbon Steel No. 919, High Speed Steel



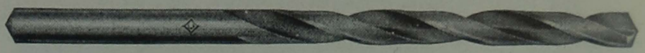
Size	Decimal Equivalent	Length Over All Inches	Price, per Dozen Carbon Steel	Price, per Dozen High Speed Steel
A	.2340	3 7/8	$3.00	$6.25
B	.2380	3 7/8	3.05	6.55
C	.2420	3 7/8	3.10	6.55
D	.2460	4	3.15	6.75
E	.2500	4	3.25	6.75
F	.2570	4 1/8	3.35	7.50
G	.2610	4 1/8	3.45	7.50
H	.2660	4 1/8	3.50	8.00
I	.2720	4 1/8	3.65	8.00
J	.2770	4 1/8	3.70	8.00
K	.2810	4 1/4	3.80	8.25
L	.2900	4 1/4	3.90	8.75
M	.2950	4 3/8	4.00	9.00
N	.3020	4 3/8	4.25	9.50
O	.3160	4 1/2	4.40	10.45
P	.3230	4 5/8	4.60	10.75
Q	.3320	4 3/4	4.75	11.75
R	.3390	4 3/4	5.05	11.75
S	.3480	4 7/8	5.15	12.75
T	.3580	4 7/8	5.50	12.75
U	.3680	5	6.00	13.75
V	.3770	5	6.00	14.65
W	.3860	5 1/8	6.50	15.00
X	.3970	5 1/8	6.75	15.85
Y	.4040	5 1/4	7.00	15.85
Z	.4130	5 1/4	7.25	17.10

Cleveland Straight Shank Twist Drills

Wire Gauge Sizes

No. 108A, Carbon Steel No. 918, High Speed Steel

No. 1207, Carbon Steel for Brass



Wire Gauge No.	Carbon Steel Per Dozen	High Speed Steel Per Dozen	Decimal Equiv.	Whole Length In.
1	$2.75	$6.45	.2280	4
2	2.75	6.45	.2210	3 15/16
3	2.75	6.15	.2130	3 15/16
4	2.75	5.95	.2090	3 7/8
5	2.75	5.95	.2055	3 13/16
6	2.50	5.95	.2040	3 13/16
7	2.50	5.45	.2010	3 3/4
8	2.50	5.45	.1990	3 11/16
9	2.50	5.45	.1960	3 11/16
10	2.50	5.25	.1935	3 5/8
11	2.25	5.25	.1910	3 9/16
12	2.25	5.25	.1890	3 9/16
13	2.25	4.85	.1850	3 1/2
14	2.25	4.85	.1820	3 7/16
15	2.25	4.85	.1800	3 7/16
16	2.00	4.65	.1770	3 3/8
17	2.00	4.65	.1730	3 5/16
18	2.00	4.50	.1695	3 5/16
19	2.00	4.35	.1660	3 1/4
20	2.00	4.35	.1610	3 3/16
21	1.90	4.35	.1590	3 3/16
22	1.90	4.15	.1570	3 1/8
23	1.90	4.05	.1540	3 1/16
24	1.90	4.05	.1520	3 1/16
25	1.90	3.90	.1495	3
26	1.80	3.90	.1470	2 15/16
27	1.80	3.90	.1440	2 15/16
28	1.80	3.60	.1405	2 7/8
29	1.80	3.60	.1360	2 13/16
30	1.80	3.60	.1285	2 13/16
31	1.75	3.30	.1200	2 3/4
32	1.75	3.30	.1160	2 11/16
33	1.75	3.30	.1130	2 11/16
34	1.75	3.15	.1110	2 5/8
35	1.75	3.15	.1100	2 9/16
36	1.75	3.10	.1065	2 9/16
37	1.75	2.95	.1040	2 1/2
38	1.75	2.95	.1015	2 7/16
39	1.75	2.95	.0995	2 7/16
40	1.75	2.80	.0980	2 3/8
41	1.70	2.80	.0960	2 5/16
42	1.70	2.75	.0935	2 5/16
43	1.70	2.60	.0890	2 1/4
44	1.70	2.60	.0860	2 3/16
45	1.70	2.60	.0820	2 3/16
46	1.65	2.50	.0810	2 1/8
47	1.65	2.50	.0785	2 1/16
48	1.65	2.50	.0760	2 1/16
49	1.65	2.50	.0730	2
50	1.65	2.40	.0700	1 15/16
51	1.60	2.40	.0670	1 15/16
52	1.60	2.40	.0635	1 7/8
53	1.60	2.40	.0595	1 13/16
54	1.60	2.40	.0550	1 13/16
55	1.60	2.40	.0520	1 3/4
56	1.55	2.40	.0465	1 11/16
57	1.55	2.40	.0430	1 11/16
58	1.55	2.40	.0420	1 5/8
59	1.55	2.40	.0410	1 9/16
60	1.55	2.40	.0400	1 9/16
61	1.50	3.50	.0390	1 1/2
62	1.50	3.50	.0380	1 1/2
63	1.50	3.50	.0370	1 1/2
64	1.50	3.50	.0360	1 1/2
65	1.50	3.50	.0350	1 1/2
66	1.50	3.50	.0330	1 1/2
67	1.50	3.50	.0320	1 7/16
68	1.50	3.50	.0310	1 7/16
69	1.50	3.50	.0292	1 3/8
70	1.50	3.50	.0280	1 5/16
71	1.50	4.25	.0260	1 5/16
72	1.50	4.25	.0250	1 1/4
73	1.50	4.25	.0240	1 3/16
74	1.50	4.25	.0225	1 1/8
75	1.50	4.25	.0210	1 1/16
76	1.50	4.25	.0200	1
77	1.50	4.25	.0180	15/16
78	1.50	4.25	.0160	7/8
79	1.50	4.25	.0145	13/16
80	1.50	4.25	.0135	3/4

Cleveland Blacksmith Drills

1/2-Inch Shank, Short Set

No. 120, Carbon Steel **No. 936, High Speed Steel**

Shanks, 1/2 inch in diameter and 2 1/4 inches long.

Diam. Inches	Carbon Steel Each	High Speed Steel Each	Length Over All Inches	Diam. Inches	Carbon Steel Each	High Speed Steel Each	Length Over All Inches
1/8	$.45	$1.40	4 7/8	23/32	$1.60	$5.25	6
5/32	.45	1.50	5 1/8	3/4	1.70	5.50	6
3/16	.50	1.60	5 1/2	25/32	1.80	5.75	6
7/32	.55	1.75	5 3/4	13/16	1.90	6.00	6
1/4	.60	1.90	6	27/32	2.00	6.25	6
9/32	.65	2.05	6	7/8	2.10	6.50	6
5/16	.70	2.20	6	29/32	2.20	6.75	6
11/32	.75	2.35	6	15/16	2.30	7.25	6
3/8	.80	2.50	6	31/32	2.40	7.75	6
13/32	.85	2.75	6	1	2.50	8.50	6
7/16	.90	3.00	6	1 1/32	2.60	....	6
15/32	.95	3.25	6	1 1/16	2.70	....	6
1/2	1.00	3.50	6	1 1/8	2.90	....	6
17/32	1.05	3.75	6	1 3/16	3.10	....	6
9/16	1.10	4.00	6	1 1/4	3.30	....	6
19/32	1.20	4.25	6	1 5/16	3.60	....	6
5/8	1.30	4.50	6	1 3/8	3.90	....	6
21/32	1.40	4.75	6	1 7/16	4.20	....	6
11/16	1.50	5.00	6	1 1/2	4.50	....	6

High speed drills with 1/2-inch shanks will be furnished in sizes over 3/4-inch diameter only at customer's risk.

No. 120 only is regularly furnished with flatted shank. It will be furnished with round shanks when so ordered. No. 936 has round shanks in all sizes.

Cleveland Blacksmith Drills

Coe Shank

No. 116, Carbon Steel **No. 931, High Speed Steel**

Shanks are 2 1/4 inches long and .648 inch diameter. Commonly called 5/8-inch.

Diam. Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Length Over All Inches	Diam. Inches	Price, Each Carbon Steel	Price, Each High Speed Steel	Length Over All Inches
1/8	$.50	....	4 7/8	23/32	$1.60	$5.25	6
5/32	.55	....	5 1/8	3/4	1.70	5.50	6
3/16	.60	....	5 1/2	25/32	1.80	5.75	6
7/32	.65	....	5 3/4	13/16	1.90	6.00	6
1/4	.70	....	6	27/32	2.00	6.25	6
9/32	.75	....	6	7/8	2.10	6.50	6
5/16	.80	....	6	29/32	2.20	6.75	6
11/32	.85	....	6	15/16	2.30	7.25	6
3/8	.90	....	6	31/32	2.40	7.75	6
13/32	.95	....	6	1	2.50	8.50	6
7/16	1.00	....	6	1 1/32	2.60	9.25	6
15/32	1.05	....	6	1 1/16	2.70	10.00	6
1/2	1.10	$3.50	6	1 1/8	2.90	11.25	6
17/32	1.15	3.75	6	1 3/16	3.10	12.50	6
9/16	1.20	4.00	6	1 1/4	3.30	13.75	6
19/32	1.25	4.25	6	1 5/16	3.60	.....	6
5/8	1.30	4.50	6	1 3/8	3.90	.....	6
21/32	1.40	4.75	6	1 7/16	4.20	.....	6
11/16	1.50	5.00	6	1 1/2	4.50	.....	6

High speed drills with 5/8-inch shank will be furnished in sizes over 3/4-inch diameter only at customer's risk.

Cleveland Square Shank Ratchet Drills

No. 111, Carbon Steel **No. 914, Cle-Forge High Speed Steel**

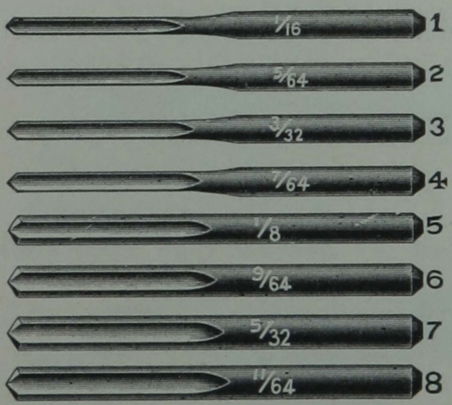
No. 1 shanks are 3/8 inch by 5/8 inch by 1 1/2 inches long.

No. 2 shanks are 1/2 inch by 3/4 inch by 1 3/4 inches long.

Unless otherwise specified, No. 2 shank will be furnished.

Diam. Inches	Carbon Steel Each	High Speed Each	Length Overall Inches	Diam. Inches	Carbon Steel Each	High Speed Each	Length Overall Inches
1/8	$.90	.....	4 1/2	27/32	$1.90	$4.20	7 1/4
5/32	.95	.....	4 5/8	7/8	2.05	4.50	7 1/2
3/16	.95	.....	4 7/8	29/32	2.20	4.70	7 3/4
7/32	1.00	.....	5	15/16	2.30	5.00	8
1/4	1.00	.....	5	31/32	2.40	5.25	8 1/4
9/32	1.05	.....	5	1	2.55	5.50	8 1/2
5/16	1.10	.....	5	1 1/32	2.70	5.75	8 3/4
11/32	1.15	.....	5	1 1/16	2.85	6.00	9
3/8	1.20	.....	6	1 3/32	3.00	6.30	9
13/32	1.25	.....	6 1/4	1 1/8	3.10	6.70	9
7/16	1.25	.....	6 1/4	1 5/32	3.25	7.00	9
15/32	1.30	.....	6 1/4	1 3/16	3.35	7.30	9
1/2	1.30	$2.90	6 1/2	1 7/32	3.50	7.60	9
17/32	1.35	2.95	6 1/2	1 1/4	3.65	7.90	9
9/16	1.35	3.00	6 1/2	1 9/32	3.75	8.25	9
19/32	1.40	3.10	6 1/2	1 5/16	3.90	8.60	9
5/8	1.40	3.20	6 1/2	1 11/32	4.05	9.00	9
21/32	1.45	3.30	6 1/2	1 3/8	4.20	9.40	9
11/16	1.45	3.40	6 1/2	1 13/32	4.35	9.80	9
23/32	1.50	3.50	6 1/2	1 7/16	4.50	10.20	9
3/4	1.55	3.65	6 1/2	1 15/32	4.65	10.60	9
25/32	1.65	3.80	6 3/4	1 1/2	4.80	11.00	9
13/16	1.75	4.00	7	.....	....	.....	...

Millers Falls Hand Drill Points



These points are for use in wood and soft metal only.

Packed per set or per dozen, in a round wooden box.

Price......
per set of 8 **$.35**
Price.per doz. **.50**

No. 113A Cleveland Straight Shank Drills

For Wood

Tests have demonstrated that drills pointed with an included angle of 135 degrees are superior to the long-pointed drills for all kinds of machine drilling in wood. When regrinding these drills the 135-degree angle to the point should be maintained.

Diam. Inches	Length Over All Inches	Price per Dozen	Diam. Inches	Length Over All Inches	Price per Dozen
1/32	1 1/2	$1.50	9/32	4 1/4	$3.80
1/16	2 1/2	1.60	5/16	4 1/2	4.35
3/32	2 3/4	1.70	11/32	4 3/4	5.05
1/8	3	1.80	3/8	5	6.00
5/32	3 1/4	1.90	13/32	5 1/4	7.00
3/16	3 1/2	2.25	7/16	5 1/2	8.50
7/32	3 3/4	2.75	15/32	5 3/4	10.00
1/4	4	3.25	1/2	6	12.00

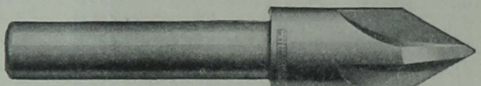
No. 114 Cleveland Bit Stock Drills

For Metal or Wood

Dimensions bit stock shanks, 3/16x3/8x1 1/4 inches long.

Diam. In.	Per Doz.	Length Overall In.	Diam. In.	Per Doz.	Length Overall In.
1/16	$2.50	3 3/8	5/8	$18.00	7 1/2
3/32	2.70	3 5/8	21/32	19.50	7 1/2
1/8	3.00	3 7/8	11/16	21.00	7 1/2
5/32	3.50	4 1/8	23/32	22.50	7 1/2
3/16	4.00	4 3/8	3/4	24.00	7 1/2
7/32	4.50	4 5/8	25/32	25.50	7 1/2
1/4	5.00	5 1/8	13/16	27.00	7 1/2
9/32	6.00	5 1/4	27/32	28.50	7 1/2
5/16	7.00	5 1/2	7/8	30.00	7 1/2
11/32	8.00	5 3/4	29/32	31.50	7 1/2
3/8	8.50	5 7/8	15/16	33.00	7 1/2
13/32	9.25	6	31/32	34.50	7 1/2
7/16	10.50	6 1/4	1	36.00	7 1/2
15/32	11.75	6 5/8	1 1/16	39.00	7 1/2
1/2	13.00	6 3/4	1 1/8	42.00	7 1/2
17/32	14.25	7 1/2	1 3/16	45.00	7 1/2
9/16	15.50	7 1/2	1 1/4	48.00	7 1/2
19/32	16.75	7 1/2	.....	.....	...

No. 115A Cleveland Machine Countersinks

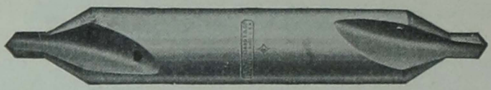


Included angle at point 60°, 72° or 82° can be furnished. Furnished with 1/2-inch shanks unless otherwise specified.

Diameter..............inches	1/2	5/8	3/4	7/8	1
No. 115A................each	$.75	.95	1.10	1.30	1.50

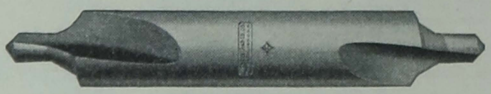
Cleveland Drills and Countersinks Combined

No. 98, Carbon Steel **No. 998, High Speed Steel**



Bell Type

No. 96, Carbon Steel **No. 996, High Speed Steel**



The drill ends are both of the same diameter. The included angle of countersink is 60°. Special sizes or angles made to order.

Size	Carbon Steel per Doz.	High Speed Steel per Doz.	Diam. Body In.	Diam. Drills In.	Length Over All In.
A-1	$2.50	$8.00	1/8	3/64	1 1/4
C-2	3.00	8.00	13/64	1/16	1 7/8
D-1	3.25	8.00	15/64	5/64	2
E-1	3.50	8.00	3/10	3/32	2 1/8
E-2	3.50	8.00	3/10	1/8	2 1/8
F-1	4.50	12.00	7/16	5/32	2 3/4
F-2	4.50	12.00	7/16	3/16	2 3/4
J-1	5.75	18.00	1/2	7/32	3
J-2	5.75	18.00	1/2	9/32	3
M-1	9.00	24.00	5/8	7/32	3 1/4
M-2	9.00	24.00	5/8	9/32	3 1/4
N-1	11.75	32.00	3/4	1/4	3 1/2
N-2	11.75	32.00	3/4	5/16	3 1/2
....	.....	.....	..	..	...

Cleveland Drills and Countersinks Combined in Sets

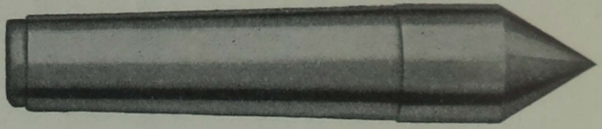
No. 19, Carbon Steel **No. 49, High Speed Steel**

Set No. 19 is composed of drills and countersinks No. 98, sizes A1, C2, D1, E1, E2, F1, F2. This range of sizes will be found ample to cover the center hole requirements of almost every shop. The set is packed in a neat wooden box with an individual hole for each tool to avoid misplacement and to permit quick selection.

No. **19**, Complete Set..........................	each	**$2.80**
No. **49**, Complete Set..........................	each	**6.45**

No. 890 Cleveland Lathe Centers

High Speed Steel



Has high speed point; both ends hardened; shank accurately ground. The included angle of the point is 60, ground true. The accuracy of angle of this tool can be depended upon. It can be operated at a high rate of speed without danger of burning.

Taper Shank No.....	0	1	2	3	4	5
Each...............	$1.50	1.75	2.50	3.25	4.75	9.25
Whole Length......in.	2 7/8	3 5/16	4 3/16	5 1/4	6 3/4	8 1/2
Length Body......in.	3/4	1	1 7/16	1 7/8	2 7/16	3 1/16

No. 57 Cleveland Mechanics' Drill Sets

CLEVELAND
DRILL SET
CLE-FORGE DRILLS

This set of Cle-Forge High Speed Drills consists of 8 sizes: 1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4 and 9/32 inch.

Designed for use in the smaller sizes of electric drills by automobile repair shops, small machine shops, farms, vocational schools, and the thousands of individual owners of portable electric drills.

Equipped with a nickeled revolving cap making it easy to locate any size drill instantly, this is a convenient small drill set.

No. **57**....................................per set **$3.55**

Cleveland Twist Drills

THE
CLEVELAND
TWIST DRILL COMPANY

As distributors of The Cleveland Twist Drill Company's line we invite your inquiries and orders for the many tools not illustrated in this catalog. Complete catalogs and information will be cheerfully sent.

Cleveland Drill Sets

No. 6

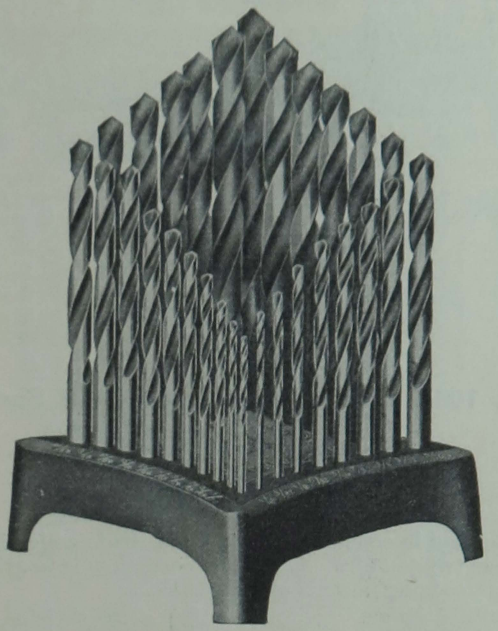
No.	Description	Per Set With Stand or Container	Without Stand
1	Taper Shank Drills ¼ to 1 In. by 16ths..	.....	$22.40
2	Taper Shank Drills ⅜ to 1¼ In. by 16ths.	.....	40.10
3	Taper Shank Drills ⅜ to ¾ In. by 32nds and 13/16 to 1¼ In. by 16ths...........	.....	48.50
5	Short Set Straight Shank Drills 1/16 to ½ In. by 64ths*.........................	$15.00	12.50
6	Short Set Straight Shank Drills 1/16 to ½ In. by 32nds*......................	9.50	7.00
7	Wire Gauge Drills No. 1 to No. 60, Short Set Straight Shank Drills ¼ to ⅜ In. by 32nds*...........................	15.75	13.25
8	Wire Gauge Drills No. 1 to No. 60*.....	13.35	10.85
9	Wire Gauge Drills Alternate Nos. from 1 to 59*............................	8.50	6.00
10	Jewelers' Set of 36 Drills, No. 30 (⅛ In.) to No. 65 Wire Gauge in Mahogany Case with Cap......................	9.50	6.00
11	Straight Shank Drills, Letter Size A to Z*	13.50	11.00
13	Bit Stock Drills, 1/16 to ¼ In. by 32nds, 5/16 to ⅜ In. by 16ths in Screw-top Wooden Box........................	4.25	.....
13A	Wood Bits for Brace, 1/16 to ¼ In. by 32nds, 5/16 to ⅜ In. by 16ths in Screw-Top Wooden Box.................	4.00	.....
13B	Wood Bits for Brace, ⅛ to ¼ In. by 32nds, 5/16 to ⅜ In. by 16ths in Corduroy Silk Case............................	3.70	.....
14B	Bit Stock Drills, ⅛ to ¼ In. by 32nds, 5/16 to ⅜ In. by 16ths in Leatherette Case	4.35	.....
18	Short Set Straight Shank Drills 1/16 to 3/16 In. by 64ths**......................	1.60	.....
22	Short Set Straight Shank Drills, 1/16 to ¼ In., 11 sizes**......................	2.10	.....
26	Short Set Straight Shank Drills, 8 Sizes 1/16 to 9/32 In. in Round Wooden Container with Slide Top..................	1.90	.....
50	Short Set Straight Shank Drills 1/16 to ½ In. by 64ths†......................	16.00	12.50
51	Short Set Straight Shank Drills 1/16 to ½ In. by 64ths†, in Dustproof Metal Carrying Case......................	17.85	12.50
52	Wire Gauge Drills No. 1 to No. 60†, in Dustproof Carrying Case............	16.20	10.85
54	Short Set Straight Shank High Speed Drills 1/16 to ½ In. by 64ths..........	.....	24.75
55	Straight Shank Drills, Size A to Z, High Speed Steel*.......................	.....	22.50
56	Short Set Straight Shank Drills, 1/16 to ¼ In. High Speed Steel**..............	3.85	.....
57	Short Set Straight Shank Drills, 8 Sizes, 1/16 to 9/32 In. in Round Wooden Container with Slide Top High Speed Steel	3.55	.....
58	Short Set Straight H.S. Drills 1/16 to ½ In. by 64ths†, in Dustproof Metal Case	29.20	24.75
59	Wire Gauge H.S. Drills No. 1 to No. 60, in Dustproof Metal Case............	23.30	18.85
60	Short Set Straight Shank Drills, 1m/m to 6.5m/m by .1m/m†..................	14.60	11.10
80	Wire Gauge Drills No. 1 to No. 60†.....	14.35	10.85
84	Wire Gauge High Speed Drills Nos. 1 to 60...............................	.....	18.85

*Mounted on maple block.
†Mounted on metal stand.
**Contained in pocket size package.

Cleveland Straight Shank Drill Sets

Jobbers' Length

No. 50, Carbon Steel **No. 54, High Speed Steel**

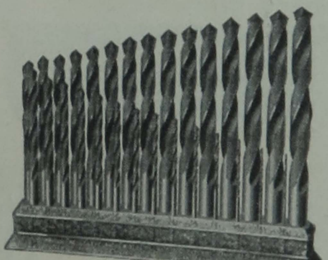


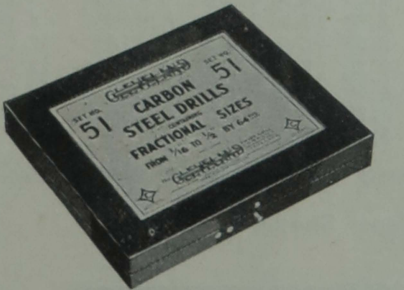
This set comprises all of the sizes of jobbers' straight shank drills from 1/16 to ½-inch, inclusive, by 64ths. Each drill fits in a hole plainly marked with its size.

As all the 32nd sizes are on one side and the 64th sizes on the opposite side, selection is made easy.

Price, No. **50** Set with Stand.................each **$16.00**
" " **54** " without Stand................ " **24.75**
" Stand only.............................. " **3.50**

Cleveland Straight Shank Drill Sets





Jobbers' Length

No. 51, Carbon Steel

No. 58, High Speed Steel

Drill sets Nos. 51 and 58 include all sizes of jobbers' straight shank drills from 1/16 inch to ½ inch, inclusive, by 64ths. Each drill fits into a hole plainly marked with its size, and on the side of the chromium-plated stand is shown the decimal equivalent of each size drill.

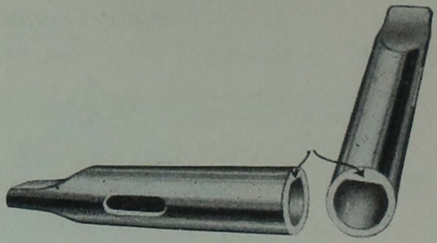
The carbon steel drill set No. 51 is packed in a strong, heavy black japanned steel case

The high speed steel set No. 58 is packed in a red lacquered steel case.

No. 51, Complete...each **$17.85**
Drill Set Only ....each **12.50**
No. 58, Complete...each **29.20**
Drill Set Only ....each **24.75**
Stand Only... ....each **5.00**
Case Only each **2.50**

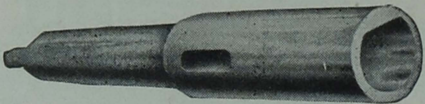
No. 100 Use-Em-Up Type Drill Sleeves

To be used in connection with twist drills which have had the tangs twisted off. All that is necessary is to grind a flat on the remaining portion of the shank.



Size No.	No. of Hole	No. of Outside	Price Each	Size No.	No. of Hole	No. of Outside	Price Each
1—2	1	2	**$1.80**	**2—5**	2	5	**$4.40**
1—3	1	3	**2.40**	**3—4**	3	4	**3.00**
1—4	1	4	**3.00**	**3—5**	3	5	**4.40**
1—5	1	5	**4.40**	**4—5**	4	5	**4.40**
2—3	2	3	**2.40**	**4—6**	4	6	**10.00**
2—4	2	4	**3.00**	**5—6**	5	6	**10.00**

No. 100A Use-Em-Up Type Drill Sockets

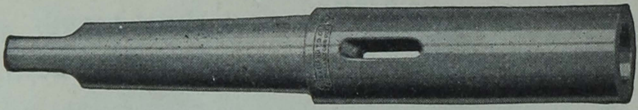


To be used in connection with twist drills which have had the tangs twisted off. All that is necessary is to grind a flat on the remaining portion of the shank.

Size No.	No. of Hole	No. of Shank	Each	Size No.	No. of Hole	No. of Shank	Each
1—2	1	2	**$2.00**	**3—4**	3	4	**$3.20**
1—3	1	3	**2.50**	**3—5**	3	5	**4.80**
1—4	1	4	**3.20**	**4—3**	4	3	**4.80**
1—5	1	5	**4.80**	**4—4**	4	4	**4.80**
2—3	2	3	**2.50**	**4—5**	4	5	**4.80**
2—4	2	4	**3.20**	**4—6**	4	6	**12.00**
2—5	2	5	**4.80**	**5—4**	5	4	**12.00**
3—2	3	2	**3.20**	**5—5**	5	5	**12.00**
3—3	3	3	**3.20**	**5—6**	5	6	**12.00**

No. 102 Cleveland Fitted Sockets

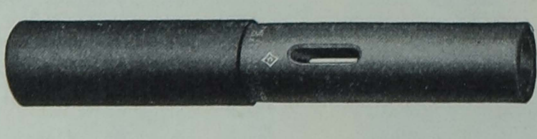
For Taper Shank Drills



Size No.	Hole No.	Shank No.	Length Over All In.	Price Each	Size No.	Hole No.	Shank No.	Length Over All In.	Price Each
1 to 2	1	2	6¾	**$2.00**	**3 to 4**	3	4	10	**$3.20**
1 to 3	1	3	7½	**2.50**	**3 to 5**	3	5	11½	**4.80**
1 to 4	1	4	8¾	**3.20**	**4 to 3**	4	3	10⅝	**4.80**
1 to 5	1	5	10	**4.80**	**4 to 4**	4	4	11⅝	**4.80**
2 to 2	2	2	7½	**2.50**	**4 to 5**	4	5	12½	**4.80**
2 to 3	2	3	8	**2.50**	**4 to 6**	4	6	16	**12.00**
2 to 4	2	4	9¼	**3.20**	**5 to 4**	5	4	13⅛	**12.00**
2 to 5	2	5	10¾	**4.80**	**5 to 5**	5	5	14½	**12.00**
3 to 2	3	2	8¼	**3.20**	**5 to 6**	5	6	16	**12.00**
3 to 3	3	3	9	**3.20**	......	..	..	....	.....

No. 100 Cleveland Rough Steel Sockets

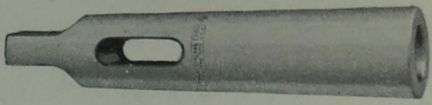
For Taper Shank Drills



No.	Each	Lgth. Over-All In.	Shank Diam. In.	Holds Tools: Drill No. 940 Diam., In.	Holds Tools: Drill No. 941 Diam., In.	Holds Tools: Drill No. 942 Diam., In.
1	**$1.20**	7½	1⅛	⅛ – 15/32	31/64– 9/16	....
2	**1.80**	8	1¼	31/64– 25/32	51/64– 29/32	⅜– 15/32
3	**2.50**	10	1½	51/64–1 1/16	1 5/64–1¼	41/64– 25/32
4	**4.00**	12½	2	1 5/64–1½	1 33/64–2	1 –1 1/16
5	**7.50**	16	2¾	1 33/64–3	3 1/16–3½	....
6	**14.00**	19	3¾	3 1/16–3½	....	....

No. 104 Cleveland Sleeve Sockets

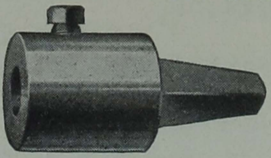
For Taper Shank Drills



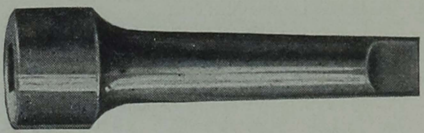
Size No.	Hole No.	Shank No.	Price, Each
1 to 2	1	2	**$1.80**
1 to 3	1	3	**2.40**
1 to 4	1	4	**3.00**
1 to 5	1	5	**4.40**
2 to 3	2	3	**2.40**
2 to 4	2	4	**3.00**
2 to 5	2	5	**4.40**
3 to 4	3	4	**3.00**
3 to 5	3	5	**4.40**
4 to 5	4	5	**4.40**
4 to 6	4	6	**10.00**
5 to 6	5	6	**10.00**

Keystone Drill Sleeves

For Straight Shank Drills



No.	For Round Shank Drills Inches	Standard Square Taper Shank, No.	Price Each
0	½	1	**$1.25**
00	41/64	1	**1.25**
01	½	2	**1.50**
001	41/64	2	**1.50**

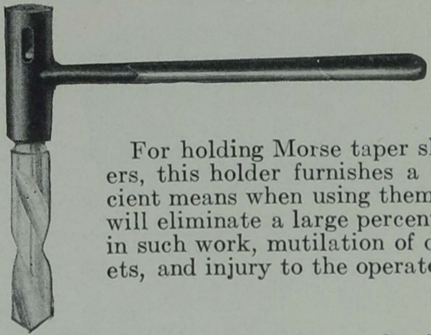


Square Shank Drill Sleeves

For Square Taper Shank Drills

No.	Sleeve Fits Ratchets, No.	Price, Ea
1	21 and 100	**$1.00**
2	22, 23, 120 and 130	**1.25**
4	24, 25, 26, 27, 140, 150, 160 and 170	**1.50**

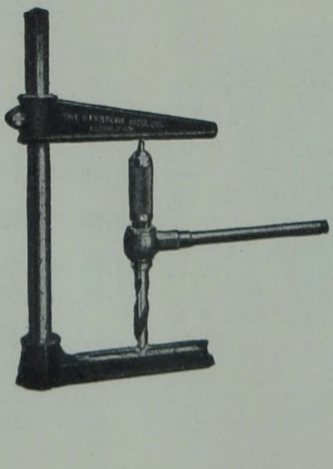
Armstrong Safety Drill Holders



For holding Morse taper shank drills and reamers, this holder furnishes a simple, safe and efficient means when using them on the lathe. Its use will eliminate a large percentage of drill breakage in such work, mutilation of drill shanks and sockets, and injury to the operator.

No.	Morse Taper Shank, No.	Holds Drills, In.	Price Each	No.	Morse Taper Shank, In.	Holds Drills, In.	Price Each
1	1	1/16 to 9/16	**$1.80**	**4**	4	1 17/64 to 2	**$4.85**
2	2	37/64 to 29/32	**2.25**	**5**	5	2 1/64 to 3	**9.00**
3	3	59/64 to 1¼	**3.00**	.	.	....	....

Keystone Drilling Post or Old Man



Foot and arm made of the best quality malleable iron, and post of solid steel. Top and bottom planed true and slotted for bolting down.

No.	Height Post In.	Radius Arm In.	Weight Pounds	Price Each Complete
0	16	8	11	**$6.00**
1	20	10	18	**8.00**
2	26	12	31	**10.00**

No.	Price, Each: Arm	Price, Each: Foot	Price, Each: Post
0	**$2.25**	**$3.00**	**$1.00**
1	**2.75**	**4.00**	**1.50**
2	**3.50**	**4.75**	**2.00**

No. 878 Cleveland Short Set Taper Shank Counterbores

With Interchangeable Pilots
High Speed Steel

Diameter Inches	Each	Length Over All Inches	Shank Taper No.	No. of Flutes	Diameter Hole Inches	Range of Pilot Sizes Inches
1/4	$3.50	3 13/16	1	3	3/32	1/8- 3/16
9/32	3.50	3 13/16	1	3	3/32	1/8- 7/32
5/16	3.50	3 13/16	1	3	3/32	1/8- 1/4
11/32	3.70	3 13/16	1	3	3/32	1/8- 9/32
3/8	3.70	4 1/16	1	3	5/32	3/16- 5/16
13/32	3.90	4 1/16	1	3	5/32	3/16- 11/32
7/16	3.90	4 1/16	1	3	5/32	3/16- 3/8
15/32	4.15	4 5/16	1	3	3/16	1/4- 13/32
1/2	4.15	4 5/16	1	3	3/16	1/4- 7/16
17/32	4.40	4 5/16	1	3	3/16	1/4- 15/32
9/16	4.40	4 5/16	1	3	3/16	1/4- 1/2
19/32	4.70	5 1/8	2	3	3/16	1/4- 17/32
5/8	4.70	5 1/8	2	3	3/16	1/4- 9/16
21/32	4.95	5 1/8	2	3	3/16	1/4- 19/32
11/16	4.95	5 1/8	2	3	3/16	1/4- 5/8
23/32	5.20	5 3/8	2	3	1/4	5/16- 21/32
3/4	5.20	5 3/8	2	3	1/4	5/16- 11/16
25/32	5.45	5 3/8	2	3	1/4	5/16- 23/32
13/16	5.45	5 3/8	2	3	1/4	5/16- 3/4
7/8	5.70	5 3/8	2	3	1/4	5/16- 13/16
15/16	6.00	6 1/8	3	3	1/4	5/16- 7/8
1	6.25	6 3/8	3	3	5/16	3/8- 15/16
1 1/16	6.50	6 3/8	3	3	5/16	3/8-1
1 1/8	6.75	6 3/8	3	3	5/16	3/8-1 1/16
1 3/16	7.00	6 3/8	3	3	5/16	3/8-1 1/8
1 1/4	7.50	6 5/8	3	5	3/8	7/16-1 3/16
1 5/16	8.00	6 5/8	3	5	3/8	7/16-1 1/4
1 3/8	8.50	6 5/8	3	5	3/8	7/16-1 5/16
1 7/16	9.50	7 7/8	4	5	3/8	7/16-1 3/8
1 1/2	10.00	7 7/8	4	5	3/8	7/16-1 7/16
1 9/16	10.75	8 1/8	4	5	7/16	1/2-1 1/2
1 5/8	11.50	8 1/8	4	5	7/16	1/2-1 9/16
1 11/16	12.25	8 1/8	4	5	7/16	1/2-1 5/8
1 3/4	13.00	8 1/8	4	5	7/16	1/2-1 11/16
1 13/16	13.75	8 1/8	4	5	7/16	1/2-1 3/4
1 7/8	14.50	8 1/8	4	5	7/16	1/2-1 13/16
1 15/16	15.50	8 1/8	4	5	7/16	1/2-1 7/8
2	16.50	8 3/8	4	5	1/2	9/16-1 15/16
2 1/8	18.75	9 7/8	5	5	1/2	9/16-2 1/16
2 1/4	20.25	9 7/8	5	5	1/2	9/16-2 3/16
2 3/8	21.75	9 7/8	5	5	1/2	9/16-2 5/16
2 1/2	23.25	9 7/8	5	5	1/2	9/16-2 7/16
2 5/8	25.25	9 7/8	5	5	1/2	9/16-2 9/16
2 3/4	27.25	9 7/8	5	5	1/2	9/16-2 11/16
2 7/8	29.50	9 7/8	5	5	1/2	9/16-2 13/16
3	32.00	9 7/8	5	5	1/2	9/16-2 15/16

The above counterbores can be furnished in straight shank or taper shank long set if desired.

Extra Pilots

Diameter Inches	Each	Diameter Inches	Each	Diameter Inches	Each
1/8	$.90	1	$1.85	2	$3.75
5/32	.90	1 1/16	2.00	2 1/16	4.00
3/16	.90	1 1/8	2.00	2 1/8	4.00
7/32	1.00	1 3/16	2.25	2 3/16	4.25
1/4	1.00	1 1/4	2.25	2 1/4	4.25
5/16	1.10	1 5/16	2.50	2 5/16	4.50
3/8	1.10	1 3/8	2.50	2 3/8	4.50
7/16	1.25	1 7/16	2.75	2 7/16	4.75
1/2	1.25	1 1/2	2.75	2 1/2	4.75
9/16	1.40	1 9/16	3.00	2 9/16	5.00
5/8	1.40	1 5/8	3.00	2 5/8	5.00
11/16	1.55	1 11/16	3.25	2 11/16	5.25
3/4	1.55	1 3/4	3.25	2 3/4	5.25
13/16	1.70	1 13/16	3.50	2 13/16	5.50
7/8	1.70	1 7/8	3.50	2 7/8	5.50
15/16	1.85	1 15/16	3.75	2 15/16	5.75

Fraction and decimal sizes of pilots not listed can be furnished at prices of next larger size.

When ordering pilots, specify size of counterbore.

No. 879 Cleveland Short Set Straight Shank Counterbores

With Interchangeable Pilots
High Speed Steel

Diam. In.	Each	Lgth. Over All In.	Size and Length of Shank In.	No. of Flutes	Diam. Hole In.	Range of Pilot Sizes In.
1/4	$3.50	3 13/16	15/64 x 3 1/16	3	3/32	1/8- 3/16
9/32	3.50	3 13/16	17/64 x 3 1/16	3	3/32	1/8- 7/32
5/16	3.50	3 13/16	19/64 x 3 1/16	3	3/32	1/8- 1/4
11/32	3.70	3 13/16	5/16 x 3 1/16	3	3/32	1/8- 9/32
3/8	3.70	4 1/16	5/16 x 3 1/16	3	5/32	3/16- 5/16
13/32	3.90	4 1/16	3/8 x 3 1/16	3	5/32	3/16-11/32
7/16	3.90	4 1/16	3/8 x 3 1/16	3	5/32	3/16- 3/8
15/32	4.15	4 5/16	7/16 x 3 1/16	3	3/16	1/4-13/32
1/2	4.15	4 5/16	7/16 x 3 1/16	3	3/16	1/4- 7/16
17/32	4.40	4 5/16	1/2 x 3 1/16	3	3/16	1/4-15/32
9/16	4.40	4 5/16	1/2 x 3 1/16	3	3/16	1/4- 1/2
19/32	4.70	5 1/8	1/2 x 3 7/8	3	3/16	1/4-17/32
5/8	4.70	5 1/8	1/2 x 3 7/8	3	3/16	1/4- 9/16
21/32	4.95	5 1/8	1/2 x 3 7/8	3	3/16	1/4-19/32
11/16	4.95	5 1/8	1/2 x 3 7/8	3	3/16	1/4- 5/8
23/32	5.20	5 3/8	1/2 x 3 7/8	3	1/4	5/16-21/32
3/4	5.20	5 3/8	1/2 x 3 7/8	3	1/4	5/16-11/16
25/32	5.45	5 3/8	5/8 x 3 7/8	3	1/4	5/16-23/32
13/16	5.45	5 3/8	5/8 x 3 7/8	3	1/4	5/16- 3/4
7/8	5.70	5 3/8	3/4 x 3 7/8	3	1/4	5/16-13/16
15/16	6.00	6 1/8	3/4 x 4 5/8	3	1/4	5/16- 7/8
1	6.25	6 3/8	3/4 x 4 5/8	3	5/16	3/8-15/16
1 1/16	6.50	6 3/8	3/4 x 4 5/8	3	5/16	3/8-1
1 1/8	6.75	6 3/8	1 x 4 5/8	3	5/16	3/8-1 1/16
1 3/16	7.00	6 3/8	1 x 4 5/8	3	5/16	3/8-1 1/8
1 1/4	7.50	6 5/8	1 x 4 5/8	5	3/8	7/16-1 3/16
1 5/16	8.00	6 5/8	1 x 4 5/8	5	3/8	7/16-1 1/4
1 3/8	8.50	6 5/8	1 x 4 5/8	5	3/8	7/16-1 5/16
1 7/16	9.50	7 7/8	1 1/4 x 5 7/8	5	3/8	7/16-1 3/8
1 1/2	10.00	7 7/8	1 1/4 x 5 7/8	5	3/8	7/16-1 7/16
1 9/16	10.75	8 1/8	1 1/4 x 5 7/8	5	7/16	1/2-1 1/2
1 5/8	11.50	8 1/8	1 1/4 x 5 7/8	5	7/16	1/2-1 9/16
1 11/16	12.25	8 1/8	1 1/4 x 5 7/8	5	7/16	1/2-1 5/8
1 3/4	13.00	8 1/8	1 1/4 x 5 7/8	5	7/16	1/2-1 11/16
1 13/16	13.75	8 1/8	1 1/2 x 5 7/8	5	7/16	1/2-1 3/4
1 7/8	14.50	8 1/8	1 1/2 x 5 7/8	5	7/16	1/2-1 13/16
1 15/16	15.50	8 1/8	1 1/2 x 5 7/8	5	7/16	1/2-1 7/8
2	16.50	8 3/8	1 1/2 x 5 7/8	5	1/2	9/16-1 15/16
2 1/8	18.75	9 7/8	1 1/2 x 7 3/8	5	1/2	9/16-2 1/16
2 1/4	20.25	9 7/8	1 1/2 x 7 3/8	5	1/2	9/16-2 3/16
2 3/8	21.75	9 7/8	1 3/4 x 7 3/8	5	1/2	9/16-2 5/16
2 1/2	23.25	9 7/8	1 3/4 x 7 3/8	5	1/2	9/16-2 7/16
2 5/8	25.25	9 7/8	1 3/4 x 7 3/8	5	1/2	9/16-2 9/16
2 3/4	27.25	9 7/8	1 3/4 x 7 3/8	5	1/2	9/16-2 11/16
2 7/8	29.50	9 7/8	1 3/4 x 7 3/8	5	1/2	9/16-2 13/16
3	32.00	9 7/8	1 3/4 x 7 3/8	5	1/2	9/16-2 15/16

The above counterbores can also be furnished in straight shank or taper shank long set if desired.

Extra Pilots

Diameter Inches	Each	Diameter Inches	Each	Diameter Inches	Each
1/8	$.90	1	$1.85	2	$3.75
5/32	.90	1 1/16	2.00	2 1/16	4.00
3/16	.90	1 1/8	2.00	2 1/8	4.00
7/32	1.00	1 3/16	2.25	2 3/16	4.25
1/4	1.00	1 1/4	2.25	2 1/4	4.25
5/16	1.10	1 5/16	2.50	2 5/16	4.50
3/8	1.10	1 3/8	2.50	2 3/8	4.50
7/16	1.25	1 7/16	2.75	2 7/16	4.75
1/2	1.25	1 1/2	2.75	2 1/2	4.75
9/16	1.40	1 9/16	3.00	2 9/16	5.00
5/8	1.40	1 5/8	3.00	2 5/8	5.00
11/16	1.55	1 11/16	3.25	2 11/16	5.25
3/4	1.55	1 3/4	3.25	2 3/4	5.25
13/16	1.70	1 13/16	3.50	2 13/16	5.50
7/8	1.70	1 7/8	3.50	2 7/8	5.50
15/16	1.85	1 15/16	3.75	2 15/16	5.75

Fraction and decimal sizes of pilots not listed can be furnished at prices of next larger size.

When ordering pilots, specify size of counterbore.

No. 515 Cleveland Peerless High Speed Chucking Reamers

Taper Shank

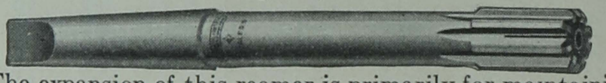
Diam. In.	Each	Lgth. Flute In.	Lgth. Over All In.
1/2	$2.70	1	8
17/32	2.80	1	8
9/16	2.90	1 1/8	8
19/32	3.00	1 1/8	8
5/8	3.10	1 1/4	9
21/32	3.20	1 1/4	9
11/16	3.30	1 1/4	9
23/32	3.50	1 1/4	9
3/4	3.70	1 3/8	9 1/2
25/32	3.90	1 3/8	9 1/2
13/16	4.10	1 3/8	9 1/2
27/32	4.30	1 3/8	9 1/2
7/8	4.50	1 1/2	10
29/32	4.75	1 1/2	10
15/16	5.00	1 1/2	10
31/32	5.25	1 1/2	10
1	5.50	1 5/8	10 1/2
1 1/16	6.00	1 5/8	10 1/2
1 1/8	6.50	1 3/4	11
1 3/16	7.00	1 3/4	11
1 1/4	7.60	1 7/8	11 1/2
1 5/16	7.90	1 7/8	11 1/2
1 3/8	8.20	2	12
1 7/16	8.60	2	12
1 1/2	9.00	2 1/8	12 1/2

Above Reamers Have Shank Tapers as Follows

Diam. (Incl.)...........in.	1/2 to 23/32	3/4 to 1 1/16	1 1/8 to 1 1/2
Shank Taper..........No.	2	3	4

No. 516 Cleveland Peerless Taper Shank Expansion Chucking Reamers

High Speed



The expansion of this reamer is primarily for maintaining the size at the point where it wears in use. Not intended to ream smaller than the size stamped on the shank.

Diam. In.	Each	Length Flute In.	Length Overall In.	Diam. In.	Each	Length Flute In.	Length Overall In.
1/2	$4.75	1	8	1 7/16	$13.10	2	12
17/32	4.90	1	8	1 1/2	13.60	2 1/8	12 1/2
9/16	5.00	1 1/8	8	1 9/16	14.20	2 1/8	12 1/2
19/32	5.15	1 1/8	8	1 5/8	14.85	2 1/4	13
5/8	5.25	1 1/4	9	1 11/16	15.50	2 1/4	13
21/32	5.40	1 1/4	9	1 3/4	16.30	2 3/8	13 1/2
11/16	5.50	1 1/4	9	1 13/16	17.10	2 3/8	13 1/2
23/32	5.75	1 1/4	9	1 7/8	18.00	2 1/2	14
3/4	6.00	1 3/8	9 1/2	1 15/16	18.90	2 1/2	14
25/32	6.20	1 3/8	9 1/2	2	19.80	2 1/2	14
13/16	6.40	1 3/8	9 1/2	2 1/16	20.70	2 3/4	14 1/2
27/32	6.70	1 3/8	9 1/2	2 1/8	21.60	2 3/4	14 1/2
7/8	7.00	1 1/2	10	2 3/16	23.50	2 3/4	14 1/2
2 /32	7.30	1 1/2	10	2 1/4	24.50	2 3/4	14 1/2
15/16	7.60	1 1/2	10	2 5/16	25.60	3	15
31/32	7.90	1 1/2	10	2 3/8	26.75	3	15
1	8.30	1 5/8	10 1/2	2 7/16	28.00	3	15
1 1/32	8.60	1 5/8	10 1/2	2 1/2	29.30	3	15
1 1/16	9.00	1 5/8	10 1/2	2 9/16	30.75	3 1/4	15 1/2
1 3/32	9.40	1 5/8	10 1/2	2 5/8	32.25	3 1/4	15 1/2
1 1/8	9.80	1 3/4	11	2 11/16	33.80	3 1/4	15 1/2
1 5/32	10.20	1 3/4	11	2 3/4	35.40	3 1/4	15 1/2
1 3/16	10.60	1 3/4	11	2 13/16	37.00	3 1/2	16
1 7/32	11.00	1 3/4	11	2 7/8	38.70	3 1/2	16
1 1/4	11.50	1 7/8	11 1/2	2 15/16	40.50	3 1/2	16
1 5/16	12.00	1 7/8	11 1/2	3	42.50	3 1/2	16
1 3/8	12.50	2	12	.....	.....	.	....

Above Reamers Have Shank Tapers as Follows

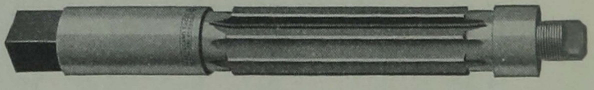
Diam. Incl......in.	1/2 to 23/32	3/4 to 1 3/32	1 1/8 to 1 11/16	1 3/4 to 3
Shank Taper....No.	2	3	4	5

Cleveland Straight Fluted Hand Reamers

No. 128A, Carbon Steel **No. 624, High Speed Steel**

Diam. In.	Carbon Steel Each	High Speed Steel Each	Lgth. Flute In.	Lgth. Over All In.	Diam. In.	Carbon Steel Each	High Speed Steel Each	Lgth. Flute In.	Lgth. Over All In.
1/8	$1.00	$3.00	1 1/2	3	5/8	$2.20	$6.25	3 1/2	7
9/64	1.20	....	1 5/8	3 1/4	21/32	2.40	6.75	3 11/16	7 11/32
5/32	1.20	3.25	1 5/8	3 1/4	11/16	2.40	6.75	3 7/8	7 11/16
11/64	1.20	....	1 3/4	3 1/2	23/32	2.60	7.25	4 1/16	8 1/8
3/16	1.20	3.25	1 3/4	3 1/2	3/4	2.60	7.25	4 3/16	8 3/8
13/64	1.40	....	1 7/8	3 3/4	25/32	2.80	7.75	4 3/8	8 23/32
7/32	1.40	3.50	1 7/8	3 3/4	13/16	2.80	7.75	4 9/16	9 1/16
15/64	1.40	....	2	4	27/32	3.10	8.50	4 11/16	9 3/8
1/4	1.40	3.50	2	4	7/8	3.10	8.50	4 7/8	9 11/16
17/64	1.50	....	2 1/8	4 1/4	29/32	3.40	9.50	5	10 3/32
9/32	1.50	3.75	2 1/8	4 1/4	15/16	3.40	9.50	5 1/8	10 1/4
19/64	1.50	....	2 1/4	4 1/2	31/32	3.70	10.50	5 5/16	10 11/16
5/16	1.50	3.75	2 1/4	4 1/2	1	3.70	10.50	5 7/16	10 7/8
21/64	1.60	....	2 3/8	4 3/4	1 1/16	4.00	11.50	5 5/8	11 1/4
11/32	1.60	4.25	2 3/8	4 3/4	1 1/8	4.30	12.75	5 13/16	11 5/8
23/64	1.60	....	2 1/2	5	1 3/16	4.60	14.25	6	12
3/8	1.60	4.25	2 1/2	5	1 1/4	4.90	15.75	6 1/8	12 1/4
25/64	1.75	....	2 5/8	5 1/4	1 5/16	5.20	17.25	6 1/4	12 7/16
13/32	1.75	4.75	2 5/8	5 1/4	1 3/8	5.60	18.75	6 5/16	12 5/8
27/64	1.75	....	2 3/4	5 1/2	1 7/16	6.00	20.50	6 7/16	12 13/16
7/16	1.75	4.75	2 3/4	5 1/2	1 1/2	6.40	22.25	6 1/2	13
29/64	1.90	....	2 7/8	5 3/4	1 9/16	6.80	.....	6 1/2	13
15/32	1.90	5.25	2 7/8	5 3/4	1 5/8	7.20	.....	6 1/2	13
31/64	1.90	....	3	6	1 11/16	7.60	.....	6 3/4	13 1/2
1/2	1.90	5.25	3	6	1 3/4	8.00	.....	6 3/4	13 1/2
33/64	2.00	....	3 1/8	6 1/4	1 13/16	8.40	.....	6 3/4	13 1/2
17/32	2.00	5.75	3 1/8	6 1/4	1 7/8	8.80	.....	7	14
35/64	2.00	....	3 1/4	6 1/2	1 15/16	9.20	.....	7	14
9/16	2.00	5.75	3 1/4	6 1/2	2	9.60	.....	7	14
19/32	2.20	6.25	3 3/8	6 3/4	.....	....	.....	....	.....

No. 129 Cleveland Common Sense Expansion Reamers



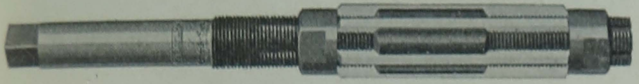
Limits of expansion recommended; 1/4 to 15/32 inch, .005 inch; 1/2 to 31/32 inch, .008 inch; 1 to 1 23/32 inch, .010 inch; 1 3/4 to 2 1/2 inches, .012 inch. The pilots on these reamers are ground slightly undersize.

Diam. Inches	Each	Length Flute Inches	Length Over All Inches	Diam. Inches	Each	Length Flute Inches	Length Over All Inches
1/4	$3.00	1 1/2	3 3/4	1 1/32	$7.25	4	8 3/4
9/32	3.10	1 5/8	3 7/8	1 1/16	7.25	4 1/16	9
5/16	3.10	1 13/16	4	1 3/32	7.75	4 1/8	9 1/8
11/32	3.20	1 13/16	4 1/8	1 1/8	7.75	4 1/8	9 1/4
3/8	3.20	1 7/8	4 1/4	1 2/32	8.30	4 3/16	9 13/16
13/32	3.30	1 13/16	4 3/8	1 3/16	8.30	4 3/16	9 9/16
7/16	3.30	1 7/8	4 1/2	1 7/32	8.90	4 1/4	9 23/32
15/32	3.40	1 7/8	4 3/4	1 1/4	8.90	4 1/4	9 7/8
1/2	3.40	1 13/16	5	1 9/32	9.50	4 3/8	10
17/32	3.65	1 15/64	5 3/16	1 5/16	9.50	4 7/16	10 1/8
9/16	3.65	2 1/16	5 3/8	1 11/32	10.50	4 1/2	10 1/4
19/32	4.00	2 3/16	5 9/16	1 3/8	10.50	4 7/16	10 3/8
5/8	4.00	2 5/16	5 3/4	1 13/32	11.50	4 1/2	10 1/2
21/32	4.40	2 1/2	6	1 7/16	11.50	4 7/16	10 5/8
11/16	4.40	2 11/16	6 1/4	1 15/32	12.50	4 1/2	10 11/16
23/32	4.80	2 3/4	6 7/16	1 1/2	12.50	4 1/2	10 3/4
3/4	4.80	2 13/16	6 5/8	1 9/16	13.00	4 5/8	11 1/8
25/32	5.25	3	6 7/8	1 5/8	13.50	4 3/4	11 1/4
13/16	5.25	3 1/16	7 1/8	1 11/16	14.00	4 7/8	11 3/8
27/32	5.75	3 1/4	7 3/8	1 3/4	14.50	5	11 1/2
7/8	5.75	3 3/8	7 9/16	1 13/16	15.00	5 1/8	11 3/4
29/32	6.25	3 1/2	7 13/16	1 7/8	15.50	5	11 3/4
15/16	6.25	3 5/8	8 1/16	1 15/16	16.00	5 1/8	12
31/32	6.75	3 13/16	8 9/32	2	16.50	5 1/8	12 1/4
1	6.75	3 7/8	8 1/2	.....	.....	...	....

All sizes and dimensions not listed are special and subject to special prices.

Cleveland Quick-Set Adjustable Reamers

No. 148, Carbon Steel **No. 649, High Speed Steel**



Quick-Set Reamer body is made of tough machinery steel. It is threaded as illustrated and the tool is adjusted by loosening one nut and tightening the other. This moves the blades in the six slots, which are milled with taper bottoms in the body. The six blades are hardened and ground, by special equipment, to close limits.

Each reamer expands to the smallest size of the next larger reamer, thereby eliminating many odd sizes which would otherwise be necessary.

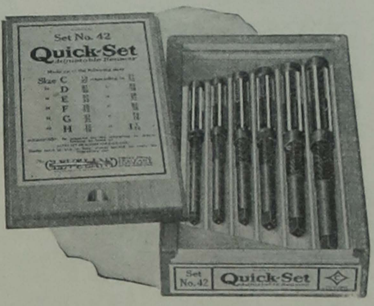
The blades of a quick-set reamer may be replaced when new blades are needed. Sold in sets of six.

In ordering blades, be sure to specify letter size stamped in shank of reamer.

Size	Carbon Steel Each	High Speed Steel Each	Range Expansion Inches	Length Over All Inches	Length Cutting Edge Inches
4/A	$3.50	$4.75	3/8 to 13/32	4 3/4	1 1/2
3/A	4.00	5.25	13/32 to 7/16	5	1 1/2
2/A	4.00	5.25	7/16 to 15/32	5 1/4	1 5/8
A	4.50	5.75	15/32 to 17/32	5 1/2	1 5/8
B	4.50	5.75	17/32 to 19/32	5 3/4	1 13/16
C	4.75	6.00	19/32 to 21/32	6 1/2	2 1/16
D	4.75	6.25	21/32 to 23/32	6 3/4	2 3/16
E	5.00	6.50	23/32 to 25/32	7	2 1/2
F	5.00	6.80	25/32 to 27/32	7 3/8	2 5/8
G	5.50	7.10	27/32 to 15/16	8	3
H	5.80	7.85	15/16 to 1 1/16	9	3 1/4
I	7.00	8.75	1 1/16 to 1 3/16	10	3 3/8
J	8.00	10.00	1 3/16 to 1 11/32	11	3 7/8
K	10.00	12.50	1 11/32 to 1 1/2	12	4 1/4
L	11.50	15.00	1 1/2 to 1 13/16	14	4 7/16
M	15.00	18.75	1 13/16 to 2 7/32	16	5
N	25.00	31.50	2 7/32 to 2 3/4	18	4 13/16
O	35.00	44.00	2 3/4 to 3 11/32	20	5 3/16

No. 42 Cleveland Quick-Set Adjustable Reamers

In Sets



Designed to take care of the every day garage needs and although it does not contain the small or large reamers, it will take care of the majority of the reaming operations in the garage. Set comprises 6 Quick-Set reamers, sizes C to H inclusive. These reamers may be adjusted to ream any size hole from 19/32 to 1 1/16-inch. Comes in a polished case with slide cover and individual compartments for each reamer.

Price, No. **42** Complete......................each **$30.80**

No. 44 Cleveland Quick-Set Adjustable Reamers

In Sets

The ideal combination for garages and repair shops which require reamers in a great range of sizes.

This set comprises 11 Quick-Set Reamers sizes A to K inclusive—a range which will handle reaming jobs from 15/32 to 1 1/2-inch. Particular attention is called to the great strength of the smaller sizes—thereby practically eliminating reamer breakage.

Comes packed in an attractive polished case with hinged cover and a receptacle for extra blades.

Price, No. **44** Complete......................each **$64.80**

No. 46 Cleveland Quick-Set Adjustable Reamers

In Sets

NO. 46 SET
Quick-Set
Adjustable Reamer
SIZES
CLEVELAND

For the mechanic who needs adjustable reamers for small holes. Also an ideal set for the farm shop as well as for the home tool chest. Consists of 3 Quick-Set reamers sizes 4/A, 3/A and 2/A, adjustable to ream any size hole from 3/8 to 15/32-inch. Packed in a small, strong wooden case, with slide cover and individual compartments for each reamer.

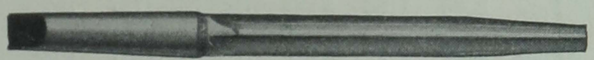
Price, No. **46** Complete......................each **$11.50**

Cleveland Taper Bridge Reamers

With Taper Shank

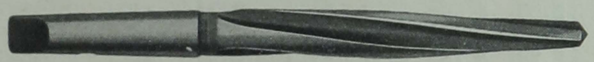
Straight Flutes

No. 150A, Carbon Steel **No. 615, High Speed Steel**



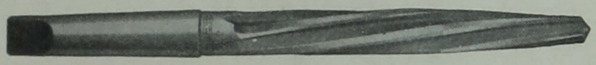
Three Fluted

No. 613, High Speed Steel



Spiral Flutes

No. 616, High Speed Steel



Nos. 613 and 616, furnished in high speed steel only.

These reamers are especially designed for severe service and particularly adapted for use in structural iron and steel, boiler plate, etc., where precision is not absolutely required.

All sizes and dimensions not listed are special and subject to special prices.

Full Diameter Inches	Carbon Each	High Speed Each	Diameter at Point Inches	Length Flute Inches	Length Overall Inches	Shank Taper No.
1/4	$2.30	.....	5/32	3 3/8	6 3/8	1
9/32	2.40	.....	11/64	3 3/4	6 3/4	1
5/16	2.40	.....	3/16	3 3/4	6 3/4	1
11/32	2.50	.....	13/64	4	7 1/4	1
3/8	2.50	.....	7/32	4	7 1/4	1
13/32	2.60	$3.40	15/64	4 3/8	8 1/4	2
7/16	2.60	3.40	1/4	4 3/8	8 1/4	2
15/32	2.75	3.65	9/32	5 1/8	9	2
1/2	2.75	3.65	5/16	5 1/8	9	2
17/32	2.90	4.00	5/16	5 1/8	9	2
9/16	2.90	4.00	3/8	5 1/8	9	2
5/8	3.05	4.70	3/8	6 1/8	10	2
11/16	3.20	5.50	3/8	7 1/8	11 3/4	3
3/4	3.35	6.00	13/32	7 3/8	12	3
13/16	3.50	6.50	7/16	7 3/8	12	3
7/8	3.75	7.00	15/32	7 3/8	12	3
15/16	4.00	7.75	1/2	7 3/8	12	3
1	4.25	8.50	1/2	7 3/8	12	3
1 1/16	4.50	9.50	17/32	7 3/8	12	3
1 1/8	4.75	10.50	11/16	7 3/8	12	3
1 3/16	5.00	11.75	3/4	7 3/8	12	3
1 1/4	5.50	14.00	13/16	7 3/8	13	4
1 5/16	6.00	15.50	7/8	7 3/8	13	4
1 3/8	6.50	17.50	1 1/16	7 3/8	13	4
1 7/16	7.00	19.50	1 1/8	7 3/8	13	4
1 1/2	8.00	22.00	1 3/16	7 3/8	13	4

Cleveland Standard Taper Pin Reamers

Straight Flute

No. 137, Carbon Steel **No. 657, High Speed Steel**

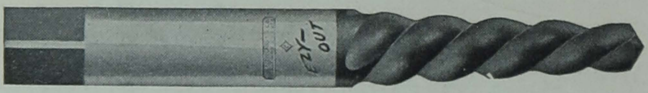
Spiral Flute

No. 139, Carbon Steel **No. 659, High Speed Steel**

Taper 1/4-inch per foot. Reamers are same taper and point of each will enter the hole reamed by next size smaller.

Size No.	Carbon Steel No. 137 Each	High Speed No. 657 Each	Carbon Steel No. 139 Each	High Speed No.659 Each	Diam. Large End In.	Diam. Small End In.	Lgth. Flute In.	Lgth. Over All In.
7/0	$1.75	$3.50	$2.10	$3.85	.0666	.0497	13/16	1 13/16
6/0	1.60	3.50	1.95	3.85	.0806	.0611	15/16	1 15/16
5/0	1.50	3.25	1.80	3.60	.0966	.0719	1 3/16	2 3/16
4/0	1.50	3.25	1.80	3.60	.1142	.0869	1 5/16	2 5/16
3/0	1.50	3.25	1.80	3.60	.1302	.1029	1 5/16	2 5/16
2/0	1.35	3.00	1.65	3.30	.1462	.1137	1 9/16	2 9/16
0	1.00	2.80	1.20	3.10	.1638	.1287	1 11/16	2 15/16
1	1.00	2.90	1.20	3.20	.1798	.1447	1 11/16	2 15/16
2	1.25	3.00	1.50	3.30	.2008	.1605	1 15/16	3 3/16
3	1.50	3.00	1.80	3.30	.2294	.1813	2 5/16	3 11/16
4	1.75	3.25	2.10	3.60	.2604	.2071	2 9/16	4 1/16
5	2.00	3.50	2.40	3.85	.2994	.2409	2 13/16	4 5/16
6	2.25	4.25	2.70	4.70	.354	.2773	3 11/16	5 7/16
7	2.50	5.25	3.00	5.80	.422	.3297	4 7/16	6 5/16
8	3.00	6.75	3.60	7.45	.505	.3971	5 3/16	7 3/16
9	3.50	8.25	4.20	9.10	.6066	.4805	6 1/16	8 5/16
10	4.50	9.00	5.40	9.90	.7216	.5799	6 13/16	9 5/16

No. 192 Cleveland Ezy-Out Screw Extractors



For removing broken cap or set screws.

Size No.	No. 192 Each	DIAMETER, INCHES Small End	Large End	Use Drill Inches	LENGTH, INCHES Flute	Over All
1	$.55	.054	.117	5/64	1/2	2
2	.60	.080	.174	7/64	3/4	2 3/8
3	.65	1/8	1/4	5/32	1	2 11/16
4	.75	3/16	21/64	1/4	1 1/8	2 7/8
5	.85	1/4	7/16	17/64	1 1/2	3 3/8
6	1.00	3/8	19/32	13/32	1 3/4	3 3/4
7	1.35	1/2	3/4	17/32	2	4 1/8
8	1.85	3/4	1	13/16	2	4 3/8
9	2.65	1	1 9/32	1 1/16	2 1/4	4 5/8
10	4.00	1 1/4	1 9/16	1 5/16	2 1/2	5
11	5.35	1 1/2	1 7/8	1 9/16	3	5 5/8
12	6.65	1 7/8	2 5/16	1 15/16	3 1/2	6 1/4

No. 15A Sets

Consists of Ezy-Out Extractors 1 to 6 inclusive.
No. 15A.................................per set **$4.00**

No. 15 Sets

Particularly for tool room use. Extractors 1 to 5 inclusive.
No. 15.................................per set **$3.00**

No. 16 Sets

For railroad, steel and structural work. Known as the heavy shop set. Extractors 6 to 9 inclusive.
No. 16.................................per set **$6.65**

No. 17 Sets

Utility set for all-around work. Extractors 4, 5 and 6.
No. 17.................................per set **$2.35**

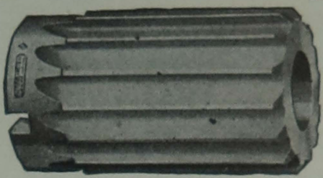
No. 20 Sets

For garage or general use. Extractors 1 to 6 inclusive with proper straight shank drill to use with each extractor.
No. 20.................................per set **$5.00**

Cleveland Fluted Shell Reamers

Eccentric Flutes

No. 130A, Carbon Steel **No. 620, High Speed Steel**



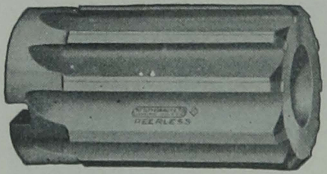
Diam. In.	Carbon Steel Each	High Speed Steel Each	Size Hole In.	Lgth. Over All In.	Diam. In.	Carbon Steel Each	High Speed Steel Each	Size Hole In.	Lgth. Over All In.
3/4	$2.10	$3.85	3/8	2 1/4	1 15/16	$6.30	$12.75	1	3 1/2
13/16	2.20	4.00	1/2	2 1/2	2	6.60	13.50	1	3 1/2
7/8	2.30	4.25	1/2	2 1/2	2 1/16	6.95	14.25	1 1/4	3 3/4
15/16	2.40	4.50	1/2	2 1/2	2 1/8	7.30	15.00	1 1/4	3 3/4
1	2.50	4.75	1/2	2 1/2	2 3/16	7.65	15.75	1 1/4	3 3/4
1 1/16	2.70	5.00	5/8	2 3/4	2 1/4	8.00	16.50	1 1/4	3 3/4
1 1/8	2.90	5.25	5/8	2 3/4	2 5/16	8.35	17.25	1 1/4	3 3/4
1 3/16	3.10	5.50	5/8	2 3/4	2 3/8	8.70	18.00	1 1/4	3 3/4
1 1/4	3.30	5.75	5/8	2 3/4	2 7/16	9.05	18.75	1 1/4	3 3/4
1 5/16	3.55	6.00	3/4	3	2 1/2	9.40	19.50	1 1/4	3 3/4
1 3/8	3.80	6.50	3/4	3	2 9/16	9.80	20.50	1 1/2	4
1 7/16	4.05	7.00	3/4	3	2 5/8	10.20	21.75	1 1/2	4
1 1/2	4.30	7.50	3/4	3	2 11/16	10.60	23.00	1 1/2	4
1 9/16	4.55	8.25	3/4	3	2 3/4	11.00	24.25	1 1/2	4
1 5/8	4.80	9.00	3/4	3	2 13/16	11.40	25.50	1 1/2	4
1 11/16	5.10	9.75	1	3 1/2	2 7/8	11.80	27.00	1 1/2	4
1 3/4	5.40	10.50	1	3 1/2	2 15/16	12.20	28.50	1 1/2	4
1 13/16	5.70	11.25	1	3 1/2	3	12.60	30.00	1 1/2	4
1 7/8	6.00	12.00	1	3 1/2	.....	.....	.....	...	...

Above Reamers Fit Arbors as Follows

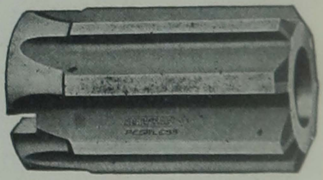
Diam. Incl. In.	Fits Arbor No.	Diam. Incl. In.	Fits Arbor No.	Diam. Incl. In.	Fits Arbor No.
3/4	4	1 5/16–1 5/8	7	2 9/16–3	10
13/16–1	5	1 11/16–2	8	.....	..
1 1/16–1 1/4	6	2 1/16–2 1/2	9	.....	..

Shell reamers have taper holes, the diameter given being at the large end.

Cleveland Peerless High Speed Shell Reamers



No. 519 Shell Reamer



No. 521 Shell Core Reamer

These reamers fit regular arbors.

Shell reamers have taper holes, the diameter given being at the large end.

Diam. Inches	Each	Size Hole Inches	Length Overall Inches	Fitting Arbor No.	Diam. Inches	Each	Size Hole Inches	Length Overall Inches	Fitting Arbor No.
* 7/8	$2.50	1/2	2 1/2	5	2	$7.50	1	3 1/2	8
* 15/16	2.65	1/2	2 1/2	5	2 1/16	8.00	1 1/4	3 3/4	9
*1	2.80	1/2	2 1/2	5	2 1/8	8.50	1 1/4	3 3/4	9
*1 1/16	3.00	5/8	2 3/4	6	2 3/16	9.00	1 1/4	3 3/4	9
*1 1/8	3.20	5/8	2 3/4	6	2 1/4	9.50	1 1/4	3 3/4	9
1 3/16	3.40	5/8	2 3/4	6	2 5/16	10.00	1 1/4	3 3/4	9
1 1/4	3.60	5/8	2 3/4	6	2 3/8	10.50	1 1/4	3 3/4	9
1 5/16	3.80	3/4	3	7	2 7/16	11.00	1 1/4	3 3/4	9
1 3/8	4.00	3/4	3	7	2 1/2	11.50	1 1/4	3 3/4	9
1 7/16	4.20	3/4	3	7	2 9/16	12.00	1 1/2	4	10
1 1/2	4.50	3/4	3	7	2 5/8	12.75	1 1/2	4	10
1 9/16	4.80	3/4	3	7	2 11/16	13.50	1 1/2	4	10
1 5/8	5.10	3/4	3	7	2 3/4	14.25	1 1/2	4	10
1 11/16	5.50	1	3 1/2	8	2 13/16	15.00	1 1/2	4	10
1 3/4	5.90	1	3 1/2	8	2 7/8	15.75	1 1/2	4	10
1 13/16	6.30	1	3 1/2	8	2 15/16	16.50	1 1/2	4	10
1 7/8	6.70	1	3 1/2	8	3	17.25	1 1/2	4	10
1 15/16	7.10	1	3 1/2	8	.....	.....	...	...	..

*No. 521 not made smaller than 1 3/16-inch.

Cleveland Patent Arbors for Shell Tools

No. 78, Straight Shank

No. 79, Taper Shank

Size No.	No. 78 Each	No. 79 Each	Diam. Shank, In.	Fitting Sizes In.	Length Overall In.	Shank Taper No.
4	$4.05	$4.90	1/2	21/32 to 25/32	9	2
5	4.50	5.40	5/8	13/16 to 1 1/32	9 1/2	2
6	4.95	5.95	3/4	1 1/16 to 1 9/32	10	3
7	5.40	6.45	7/8	1 5/16 to 1 21/32	11	3
8	6.00	7.20	1 1/8	1 11/16 to 2	12	4
9	6.75	8.10	1 3/8	2 1/16 to 2 1/2	13.	4
10	7.90	9.45	1 5/8	2 9/16 to 3	14	5

No. 532 Cleveland Straight Shank Arbors

For Peerless Shell Reamers

Size No.	Each	Fitting Size Reamer Inches	Length Overall Inches	Diam. of Shank
5	$3.00	7/8 to 1 1/32	9 1/2	5/8
6	3.30	1 1/16 to 1 9/32	10	3/4
7	3.60	1 5/16 to 1 21/32	11	7/8
8	4.00	1 11/16 to 2	12	1 1/8
9	4.50	2 1/16 to 2 1/2	13	1 3/8
10	5.25	2 9/16 to 3	14	1 5/8

No. 533 Cleveland Taper Shank Arbors

For Peerless Shell Reamers

These arbors are regular except that they have extra large taper shanks to stand high speed cuts.

Size No.	Each	Fitting Sizes Reamer Inches	Length Overall Inches	Shank Taper No.
5	$3.60	7/8 to 1 1/32	9 1/2	2
6	3.95	1 1/16 to 1 9/32	10	3
7	4.30	1 5/16 to 1 21/32	11	4
8	4.80	1 11/16 to 2	12	4
9	5.40	2 1/16 to 2 1/2	13	5
10	6.30	2 9/16 to 3	14	5

Toledo Ratchet Pipe Reamers

Capacity, 3/8 to 3 Inches Inclusive

The cutter blades of this reamer are cast solidly in the head. They cut freely, and being made of high speed steel will out-wear ordinary blades.

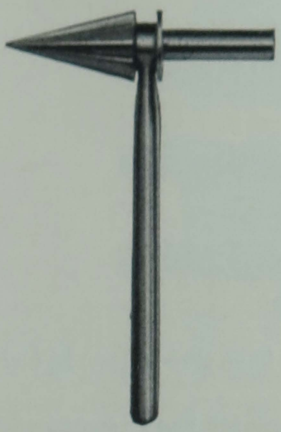
Can be readily resharpened or when worn out entire head can be replaced.

The handgrip is unique and so designed as to provide a natural position for holding the reamer.

The polished tubular handle is light in weight and unbreakable. The ratchet head is enclosed and unusually large in diameter, thereby assuring longer life to the ratchet parts.

Each.................................. **$5.60**

Toledo Junior Pipe Reamers



This all steel reamer is small, compact and easy to operate. Especially adapted for plumbers and electricians.

The multiple tooth reamer head is made from one piece of special heat-treated steel. Has accurately ground teeth. Feeds easily with only a slight pressure; cuts rapidly. Leaves a smooth, clean cut.

Capacity, 1/8 inch to 2 inches.

Weight, 2 3/4 pounds.

Each...................... **$4.00**

Cleveland Carbon Steel Burring Reamers

With Spiral Flutes

While designed and especially ground for use in a wide variety of materials, this reamer is primarily intended for the removal of burrs from cut pipe and conduit.

It may be used also for smoothing down the rough edges of an extensive range of light materials. Frequently it can be used for countersinking.

With 1/2-Inch Round Shank

No.	232	233	234
Each	$1.25	1.50	3.00
Capacity Pipe...in.	1/8 to 1	1/4 to 1 1/4	1/4 to 2
Diam. at Point...in.	3/16	1/4	1/4
Diam. at Large End...in.	1 1/4	1 15/32	2 17/64

With Bit Brace Shank for Brace or Hand Drills

No.	241	242	242 1/2	244
Each	$1.00	1.25	1.50	3.00
Capacity Pipe...in.	1/8 to 1/2	1/8 to 1	1/4 to 1 1/4	1/4 to 2
Diam. at Point...in.	3/16	3/16	1/4	1/4
Diam. at Large End.in.	47/64	1 1/4	1 15/32	2 17/64

Walton Tap Extractors

THE WALTON CO.

For removing taps broken at or below the surface of the work. Tap can be quickly removed without injury to the thread.

The prongs or fingers are crucible steel shaped to fit the flutes of the tap, and slidably mounted on a grooved holder, which is squared on its outer end for the tap wrench. After all of the chips have been cleared away, these fingers are pushed down into the flutes of the tap, and the tap screwed out by a wrench on the outer end.

The 1/4-inch size is usually used on Nos. 14 and 16 taps; 5/16-inch on Nos. 18, 19 and 20; 3/8-inch on Nos. 22, 24 and 26. Specify whether wanted for three or four fluted taps.

Other sizes are also made.

Size Tap It Will Remove Inches	Complete Each	Extra Fingers Each	Size Tap It Will Remove Inches	Complete Each	Extra Fingers Each	Size Tap It Will Remove Inches	Complete Each	Extra Fingers Each
3/16	$1.50	$.06	7/16	$1.70	$.12	1	$3.10	$.25
No. 10	1.50	.06	1/2	1.85	.15	1 1/8	3.50	.25
No. 12	1.55	.08	9/16	2.00	.15	1 1/4	4.00	.30
1/4	1.55	.10	5/8	2.20	.20	1 3/8	4.50	.30
5/16	1.60	.10	3/4	2.45	.20	1 1/2	5.00	.35
3/8	1.60	.12	7/8	2.75	.25	...	....	...

Winter Bros. Machinists' Hand Taps

WINTER BROS.CO.

Taper

WINTER BROS.CO.

Plug

WINTER BROS.CO.

Bottoming

Taps 1/8-inch diameter and under have three flutes; 5/32-inch diameter and over have four flutes.

Unless otherwise specified, orders for hand taps to and including 3/8-inch will be filled with taps having shanks full diameter of thread. Taps 7/16-inch and larger will be furnished with shanks below root of thread.

When specified, 3/8-inch hand taps with shank below root of thread will be furnished at regular prices.

Left-hand taps are special.

Diam. In.	Carbon Steel		*High Speed Steel	No. Threads per Inch — Std. Pitches				Length Over All In.
	Each	Per Set	Each	N.C.	N.F.	Whitworth Std.	N.S.	
1/16	$.50	$1.50	.....	..	..	60	64	1 5/8
3/32	.40	1.20	.....	..	..	48	48	1 3/4
1/8	.35	1.05	.....	..	..	40	40	1 15/16
5/32	.35	1.05	.....	..	..	32	32, 36	2 1/16
3/16	.40	1.20	.....	..	..	24	24, 32	2 3/8
7/32	.45	1.35	.....	..	..	24	24, 32	2 3/8
1/4	.45	1.35	$.85	20	28	20	24, 27, 32	2 1/2
5/16	.50	1.50	.95	18	24	18	20, 27, 32	2 23/32
3/8	.55	1.65	1.10	16	24	16	20, 27	2 15/16
7/16	.60	1.80	1.30	14	20	14	24, 27	3 5/32
1/2	.70	2.10	1.55	13	20	12	12, 24, 27	3 3/8
9/16	.80	2.40	1.85	12	18	12	27	3 19/32
5/8	.90	2.70	2.20	11	18	11	12, 27	3 13/16
11/16	1.05	3.15	2.60	..	..	11	11, 16	4 1/32
3/4	1.20	3.60	3.10	10	16	10	12, 27	4 1/4
7/8	1.60	4.80	4.30	9	14	9	12, 18, 27	4 11/16
1	2.00	6.00	5.75	8	14	8	12, 27	5 1/8
1 1/8	2.25	6.75	7.45	7	12	7	..	5 7/16
1 1/4	2.60	7.80	9.55	7	12	7	..	5 3/4
1 3/8	3.00	9.00	11.95	6	12	6	..	6 1/16
1 1/2	3.50	10.50	14.75	6	12	6	..	6 3/8
1 5/8	4.20	12.60	.....	.	..	5	5 1/2	6 11/16
1 3/4	5.00	15.00	.....	5	..	5	..	7
1 7/8	5.80	17.40	.....	.	..	4 1/2	5	7 5/16
2	6.70	20.10	.....	4 1/2	..	4 1/2	..	7 5/8

*High speed steel furnished at regular prices in U.S.S. (N.C.) and S.A.E. (N.F.). Standard pitches only.

Winter Bros. Stove Bolt Taps

WINTER BROS.CO.

Stove bolt taps furnished in plug style only.

All sizes and threads not listed are special, and subject to special prices.

Two fluted stove bolt taps are special.

Left-hand taps are special.

Diam. In.	No. of Threads per Inch	Price Each	Price per Doz.
3/16	24	$.40	$4.80
1/4	18	.45	5.40
5/16	18	.50	6.00
3/8	16	.55	6.60

Winter Bros. High Speed Hand Taps

Cut Thread **Commercial Ground Thread**

Precision Ground Thread

WINTER BROS.CO.

Taper

WINTER BROS.CO.

Plug

WINTER BROS.CO.

Bottoming

Cut thread taps will be furnished unless ground thread taps are specified. Commercial ground taps will be furnished unless precision ground thread taps are specified.

Furnished in taper, plug or bottoming style.

Left-hand taps are special.

Diameter Tap Inches	Each	Threads per In.		No. of Flutes	Dimensions, Inches		
		N.C.	N.F.		Diam. Shank	Size Square	Length Over All
1/4	$.85	20	28	4	.255	.191	2 1/2
5/16	.95	18	24	4	.318	.238	2 23/32
3/8	1.10	16	24	4	.275-.381	.286-.206	2 15/16
7/16	1.30	14	20	4	.323	.242	3 5/32
1/2	1.55	13	20	4	.367	.275	3 3/8
9/16	1.85	12	18	4	.429	.322	3 19/32
5/8	2.20	11	18	4	.480	.360	3 13/16
11/16	2.60	11	16	4	.542	.406	4 1/32
3/4	3.10	10	16	4	.590	.442	4 1/4
7/8	4.30	9	14–18	4	.697	.523	4 11/16
1	5.75	8	14	4	.800	.600	5 1/8
1 1/8	7.45	7	12	4	.896	.672	5 7/16
1 1/4	9.55	7	12	4	1.021	.766	5 3/4
1 3/8	11.95	6	12	4	1.108	.831	6 1/16
1 1/2	14.75	6	12	4	1.233	.925	6 3/8

Winter Bros. Machine Screw Taps

WINTER BROS.CO.
WINTER BROS.CO.
WINTER BROS.CO.

A.S.M.E. standard. Furnished in sets of taper, plug and bottoming, when desired, at regular prices.

Plug taps will be furnished unless otherwise specified.

All sizes and threads not listed will be considered special, and subject to special prices. Left-hand machine screw taps are special.

Carbon Steel

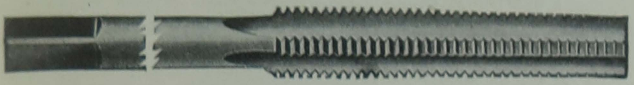
Screw Gauge No.	Each	Basic Outside Diam. In.	No. Threads per Inch		Length of Thread In.	Length Over All In.
			Std.	Also Furn.		
0	$.50	.060	80	....	5/16	1 5/8
1	.50	.073	72	56, 64	3/8	1 11/16
2	.45	.086	64	56	7/16	1 3/4
3	.40	.099	56	48	1/2	1 13/16
4	.40	.112	48	32, 36, 40	9/16	1 7/8
5	.35	.125	44	36, 40	5/8	1 15/16
6	.35	.138	40	32, 36	11/16	2
8	.35	.164	36	30, 32, 40	3/4	2 1/8
10	.40	.190	32	24, 28, 30	7/8	2 3/8
12	.45	.216	28	24, 32	15/16	2 3/8
14	.45	.242	24	20	1	2 1/2

High Speed Steel

Screw Gauge No.	Each	Basic Outside Diam. In.	No. Threads per Inch		Length of Thread In.	Length Over All In.	No. of Flutes
			Std.	Also Furn.			
4	$.70	.112	48	36, 40	9/16	1 7/8	2–3
5	.70	.125	40	44	5/8	1 15/16	2–3
6	.70	.138	40	32	11/16	2	2–3
8	.70	.164	36	32	3/4	2 1/8	3–4
10	.75	.190	32	24	7/8	2 3/8	3–4
12	.80	.216	28	24	15/16	2 3/8	3–4
14	.85	.242	24	20	1	2 1/2	3–4

Winter Bros. Nut Taps

Cut Thread
Commercial Ground Thread



Commercial ground thread taps furnished in high speed steel only.

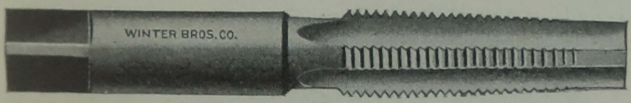
National form of thread furnished unless otherwise specified.

High speed nut taps will be regularly furnished with National form of thread only. All other high speed steel nut taps are special and subject to special prices.

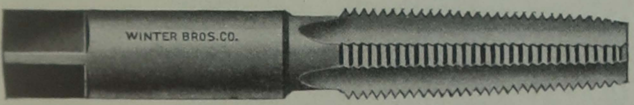
Left-hand threads are special.

Diam. In.	Carbon Steel Each	High Speed Steel Each	No. Threads per Inch Standard Pitches N.C.	N.F.	Whit.	Lth. Thread, In. N.C. and Whit.	N.F.	Length Over All In.
¼	$.60	$1.50	20	28	20	1⅝	1¼	5
5/16	.70	1.70	18	24	18	1 13/16	1⅜	5½
⅜	.80	2.00	16	24	16	2	1½	6
7/16	.90	2.40	14	20	14	2⅜	1¾	6½
½	1.00	2.70	13	20	12	2½	1⅞	7
9/16	1.15	3.35	12	18	12	2¾	2	7½
⅝	1.35	4.05	11	18	11	3	2¼	8
¾	1.85	5.65	10	16	10	3¼	2½	9
⅞	2.45	7.90	9	14, 18	9	3⅝	2¾	10
1	3.15	10.55	8	14	8	4	3	11
1⅛	3.70	.....	7	12	7	4¾	3½	11½
1¼	4.50	.....	7	12	7	4¾	3½	12
1⅜	5.50	.....	6	12	6	5⅜	4	12½
1½	6.75	.....	6	12	6	5⅜	4	13

Winter Bros. Straight and Taper Boiler Taps



Straight



Taper

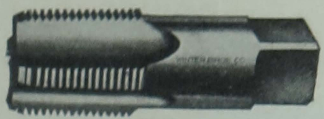
Taper boiler taps taper ¾ inch to the foot, and the diameter is measured ⅝ inch from large end of thread.

All taps are furnished with National or V form of thread at regular prices. Left-hand taps are special.

Sizes, lengths and threads not listed are special.

Diam. In.	Each	Overall In.	Diam. In.	Each	Overall In.
½	$1.05	4¼	1 1/16	$3.50	6¾
9/16	1.25	4⅝	1⅛	3.65	6⅞
⅝	1.40	5	1 3/16	3.85	7
11/16	1.60	5¼	1¼	4.05	7⅛
¾	1.95	5½	1 5/16	4.35	7¼
13/16	2.25	5¾	1⅜	4.70	7⅜
⅞	2.50	6	1 7/16	5.30	7½
15/16	2.80	6¼	1½	5.50	7⅝
1	3.35	6½	....	....	...

Winter Bros. Pipe Taps and Reamers



Tap

Reamer

American (Briggs) Standard right-hand pipe taps are furnished unless otherwise specified.

High speed steel pipe taps will be regularly furnished in American Standard taper, right hand only. All other high speed steel pipe taps are special and subject to special prices.

Straight (Plug) pipe taps to 2-inch inclusive will be furnished at regular prices in carbon steel only.

American Standard left-hand pipe taps take a different discount from right-hand.

All other left-hand pipe taps not listed are special.

Sizes, lengths and threads not listed have special prices.

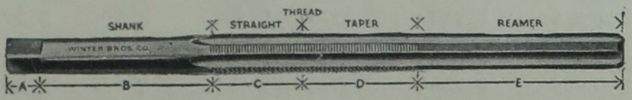
The ⅛-inch size pipe tap only will be furnished with large or small shank as desired; the ¼-inch and ⅜-inch pipe taps are regularly furnished with large shanks only; all other sizes furnished with small shank only, ⅛-inch size pipe tap furnished with large shank unless otherwise specified.

Reamers for American Standard pipe taps will be furnished at same list price as the taps but the discount is different.

Nominal Size In.	No. Threads per Inch American Std.	Whit. Std.	Length of Thread In.	Length Over All In.	Taps Carbon Steel Each	High Speed Steel Each	Interrupted Carbon Steel Each
⅛	27	28	¾	2⅛	$1.00	$1.60	$1.40
¼	18	19	1 1/16	2 7/16	1.20	1.80	1.70
⅜	18	19	1 1/16	2 9/16	1.60	2.30	2.25
½	14	14	1⅜	3⅛	2.00	4.40	2.80
⅝	..	14	1⅜	3 3/16	2.80	**	....
¾	14	14	1⅜	3¼	2.80	6.10	3.90
⅞	..	14	1 9/16	3½	4.40	**	....
1	11½	11	1¾	3¾	4.40	9.20	6.15
1¼	11½	11	1¾	4	5.00	13.10	7.00
1½	11½	11	1¾	4¼	6.60	17.70	9.25
1¾	..	11	1¾	4⅜	8.00	**	.....
2	11½	11	1¾	4½	10.00	24.00	14.00
2¼	..	11	2⅛	5	12.00	**	.....
2½	8	11	2 9/16	5½	15.00	.....	.....

**Prices upon application.

Winter Bros. Stay-Bolt Taps



Furnished with 12 National threads to the inch, unless otherwise specified. Taps with 12 threads to the inch, V form, furnished at regular prices.

Prices are for each inch of length, 20 inches and upwards.

Length In.	Dimensions, Inches A	B	C	D	E
20	1	6	1½	6	5½
24	1	8	2	6	7
27	1	10	2	6½	7½

Diam. In.	Price per Inch	Diam. In.	Price per Inch	Diam. In.	Price per Inch	Diam. In.	Price per Inch
⅞	$.45	1 1/16	$.60	1¼	$.75	1 7/16	$.90
15/16	.50	1⅛	.65	1 5/16	.80	1½	.95
1	.55	1 3/16	.70	1⅜	.85	....	...

G T D Adjustable Tap Wrenches

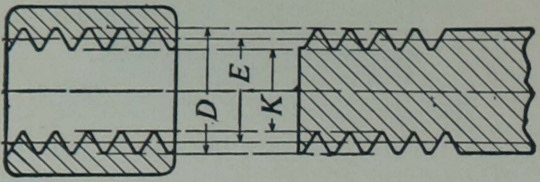
Made from drop forgings. Bodies have a neat mottled finish.

No.	Each	Capacity Taps, Inches Hand	Machine Screw	Pipe	Length Inches
4	$3.00	1/16 to 5/16	0 to 14	....	9
5	3.50	5/32 to 9/16	7 to 14	⅛	11
6	4.00	5/32 to ¾	7 to 14	⅛ to ¼	15

Basic Thread Dimensions and Tap Drill Sizes

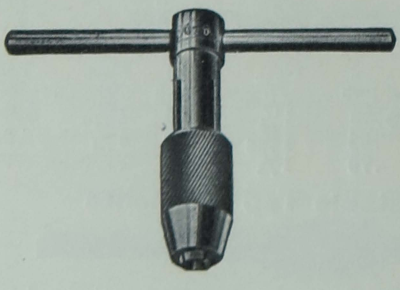
American National Coarse Thread

Formerly A.S.M.E. Regular for Sizes 1-12; U. S. Standard for Sizes 1/4-Inch and Larger



Size of Thread and Threads Per Inch	Major Diameter D Inches	Pitch Diameter E Inches	Minor Diameter K Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equiv. of Tap Drill Inches
1 x64	.0730	.0629	.0527	No. 53	.0595
2 x56	.0860	.0744	.0628	No. 50	.0700
3 x48	.0990	.0855	.0719	No. 47	.0785
4 x40	.1120	.0958	.0795	No. 43	.0890
5 x40	.1250	.1088	.0925	No. 38	.1015
6 x32	.1380	.1177	.0974	No. 36	.1065
8 x32	.1640	.1437	.1234	No. 29	.1360
10 x24	.1900	.1629	.1359	No. 25	.1495
12 x24	.2160	.1889	.1619	No. 16	.1770
1/4 x20	.2500	.2175	.1850	No. 7	.2010
5/16 x18	.3125	.2764	.2403	F	.2570
3/8 x16	.3750	.3344	.2938	5/16	.3125
7/16 x14	.4375	.3911	.3447	U	.3680
1/2 x13	.5000	.4500	.4001	27/64	.4219
9/16 x12	.5625	.5084	.4542	31/64	.4844
5/8 x11	.6250	.5660	.5069	17/32	.5312
3/4 x10	.7500	.6850	.6201	21/32	.6562
7/8 x 9	.8750	.8028	.7307	49/64	.7656
1 x 8	1.0000	.9188	.8376	7/8	.8750
1 1/8 x 7	1.1250	1.0322	.9394	63/64	.9844
1 1/4 x 7	1.2500	1.1572	1.0644	1 7/64	1.1094
1 3/8 x 6	1.3750	1.2667	1.1585	1 7/32	1.2187
1 1/2 x 6	1.5000	1.3917	1.2835	1 21/64	1.3281
1 3/4 x 5	1.7500	1.6201	1.4902	1 35/64	1.5469
2 x 4 1/2	2.0000	1.8557	1.7113	1 25/32	1.7812
2 1/4 x 4 1/2	2.2500	2.1057	1.9613	2 1/32	2.0312
2 1/2 x 4	2.5000	2.3376	2.1752	2 1/4	2.2500
2 3/4 x 4	2.7500	2.5876	2.4252	2 1/2	2.5000
3 x 4	3.0000	2.8376	2.6752	2 3/4	2.7500
3 1/4 x 4	3.2500	3.0876	2.9252	3	3.0000
3 1/2 x 4	3.5000	3.3376	3.1752	3 1/4	3.2500
3 3/4 x 4	3.7500	3.5876	3.4252	3 1/2	3.5000
4 x 4	4.0000	3.8376	3.6752	3 3/4	3.7500

G T D Tap Wrenches



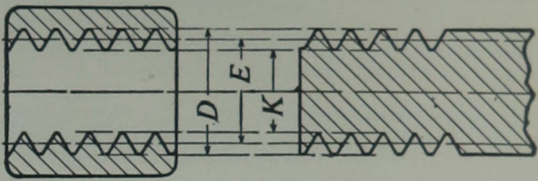
This T handle tap wrench is made from steel carefully selected for its toughness. The chuck jaws are hardened and tempered, which greatly lengthens the life of the tool. The design is simple throughout, and this tool is entirely free from delicate springs, pins, etc.

No.	Capacity (Tap Sizes) Hand Inches	Capacity (Tap Sizes) Machine Screw	Length Inches	Weight Ounces	Each
329	1/16–9/32	0–14	2 1/2	3	**$.75**
333	7/32–1/2	12–14	3 5/8	8	**1.25**

Basic Thread Dimensions and Tap Drill Sizes

American National Fine Threads

Formerly A.S.M.E. Special for Sizes 0-12; S.A.E. Standard for Sizes 1/4-Inch and Larger

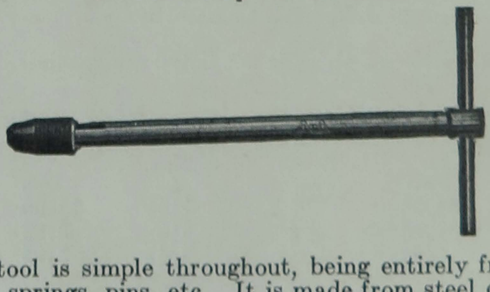


Size of Thread and Threads per Inch	Major Diameter D Inches	Pitch Diameter E Inches	Minor Diameter K Inches	Commercial Tap Drill to Produce Approx. 75% Full Thread	Decimal Equiv. of Tap Drill Inches
0 x80	.0600	.0519	.0438	3/64	.0469
1 x72	.0730	.0640	.0550	No. 53	.0595
2 x64	.0860	.0759	.0657	No. 50	.0700
3 x56	.0990	.0874	.0758	No. 45	.0820
4 x48	.1120	.0985	.0849	No. 42	.0935
5 x44	.1250	.1102	.0955	No. 37	.1040
6 x40	.1380	.1218	.1055	No. 33	.1130
8 x36	.1640	.1460	.1279	No. 29	.1360
10 x32	.1900	.1697	.1494	No. 21	.1590
12 x28	.2160	.1928	.1696	No. 14	.1820
1/4 x28	.2500	.2268	.2036	No. 3	.2130
5/16 x24	.3125	.2854	.2584	I	.2720
3/8 x24	.3750	.3479	.3209	Q	.3320
7/16 x20	.4375	.4050	.3725	25/64	.3906
1/2 x20	.5000	.4675	.4350	29/64	.4531
9/16 x18	.5625	.5264	.4903	33/64	.5156
5/8 x18	.6250	.5889	.5528	37/64	.5781
3/4 x16	.7500	.7094	.6688	11/16	.6875
7/8 x14	.8750	.8286	.7822	13/16	.8125
1 x14	1.0000	.9536	.9072	15/16	.9375
1 1/8 x12	1.1250	1.0709	1.0167	1 3/64	1.0469
1 1/4 x12	1.2500	1.1959	1.1417	1 11/64	1.1719
1 3/8 x12	1.3750	1.3209	1.2667	1 19/64	1.2969
1 1/2 x12	1.5000	1.4459	1.3917	1 27/64	1.4219

Drill List for Pipe Taps

Nominal Size, In.	Drill Size, In.	Nominal Size, In.	Drill Size, In.
1/8	R	**1 1/2**	1 47/64
1/4	7/16	**2**	2 7/32
3/8	37/64	**2 1/2**	2 5/8
1/2	23/32	**3**	3 1/4
3/4	59/64	**3 1/2**	3 3/4
1	1 5/32	**4**	4 1/4
1 1/4	1 1/2	...	...

G T D Tap Wrenches

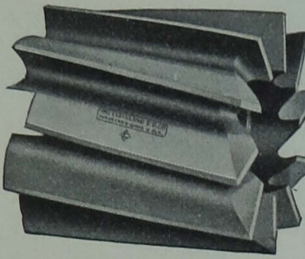


This tool is simple throughout, being entirely free from delicate springs, pins, etc. It is made from steel carefully selected for its toughness. The chuck jaws are hardened and tempered.

No.	Capacity (Tap Sizes) Hand Inches	Capacity (Tap Sizes) Machine Screw	Length Inches	Weight Pounds	Price Each
336	1/16–9/32	0–14	8 3/4	1/2	**$1.25**
337	7/32–1/2	12–14	10 5/8	1 1/4	**1.75**

No. 671 Cleveland High Speed Steel Coarse Tooth Shell End Mills

Spiral Flutes



Regularly furnished with either right or left-hand cut. Right-hand mills have right-hand spiral flutes, and left-hand mills have left-hand spiral flutes. Mill has straight arbor holes. Conforms to National standard dimensions adopted by the Simplified Practice Committee on Milling Cutters.

End mills having dimensions other than listed are special and are subject to special prices. When ordering always state whether right or left hand cut is wanted.

Always give list No. when ordering.

Diameter Inches	Each	Length Cut Inches	Size Hole Inches	Size Driving Slots Inches Width	Size Driving Slots Inches Depth
1¼	$5.40	1	½	¼	5/32
1½	6.00	1⅛	½	¼	5/32
1¾	6.70	1¼	¾	5/16	3/16
2	7.70	1⅜	¾	5/16	3/16
2¼	9.00	1½	1	⅜	7/32
2½	10.70	1⅝	1	⅜	7/32
2¾	12.10	1⅝	1	⅜	7/32
3	14.20	1¾	1¼	½	9/32
3½	19.20	1⅞	1¼	½	9/32

No. 196 Cleveland Arbors for Shell End Mills

With Brown & Sharpe Shank

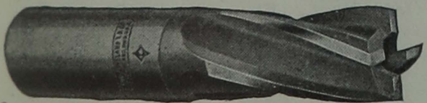
Size Arbor No.	Each	Fitting Sizes, In.	Shank Taper No.
1	$8.00	1¼ to 1½	7
2	8.00	1¾ to 2	9
3	9.75	2¼ to 2¾	10
4	10.50	3 to 3½	11

For mills with straight holes. State whether for right or left-hand mills. When desired will be furnished with shank tapped for draw-in bolt. Specify size of hole, form of thread and whether right or left-hand thread.

Cleveland Coarse Tooth End Mills

Straight Shank—Spiral Flutes

No. 184, Carbon Steel **No. 674, High Speed Steel**



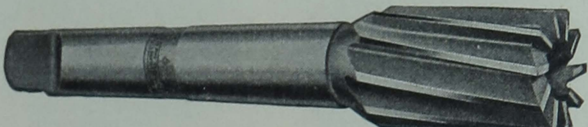
Have large deep center holes facilitating resharpening. Right-hand mills have right-hand flutes and left-hand mills have left-hand flutes. Mills other than listed are subject to special prices.

Diameter Inches	Carbon Each	High Speed Each	Length Cut Inches	Length Overall Inches
¼	$.90	$1.80	⅝	1 11/16
5/16	1.00	1.90	11/16	1¾
⅜	1.10	2.10	¾	1 13/16
7/16	1.20	2.30	⅞	2 3/16
½	1.30	2.50	15/16	2¼
9/16	1.40	2.70	1	2 5/16
⅝	1.50	3.00	1⅛	2½
¾	1.80	3.50	1¼	2⅝

Cleveland Spiral-fluted End Mills

With Regular Taper Shanks

No. 185, Carbon Steel **No. 675, High Speed Steel**



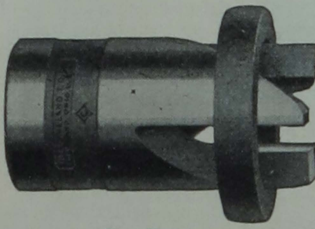
Regularly furnished with right-hand cut and right-hand spiral flutes. Left-hand end mills are special. Illustration shows a right-hand mill.

These mills have large deep center holes which will facilitate resharpening. Mills having dimensions other than listed are subject to special prices. State whether right or left-hand cut is wanted, also state shank number wanted.

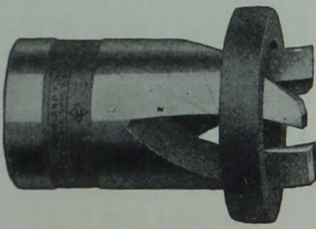
Diameter Inches	Carbon Each	High Speed Each	Length Cut Inches	Length Overall Inches	Shank Taper No.
¼	$1.60	$3.20	⅝	3½	1
5/16	1.70	3.30	11/16	3 9/16	1
⅜	1.70	3.30	¾	3⅝	1
7/16	1.70	3.30	⅞	3¾	1
½	1.70	3.40	15/16	3 13/16	1
½	2.40	4.80	15/16	4 7/16	2
⅝	2.50	4.90	1⅛	4⅝	2
¾	2.50	4.90	1¼	4¾	2
¾	3.50	7.00	1¼	5 9/16	3
⅞	2.90	5.70	1 7/16	4 15/16	2
⅞	3.50	7.00	1 7/16	5¾	3
1	3.30	6.60	1⅝	5⅛	2
1	3.70	7.30	1⅝	5 15/16	3
1⅛	4.20	8.40	1¾	6 1/16	3
1¼	4.80	9.60	2	6 5/16	3

Cleveland Adjustable Hollow Mills

No. 182, Carbon Steel **No. 183, Carbon Steel**
No. 662, High Speed Steel **No. 663, High Speed Steel**



For Brass

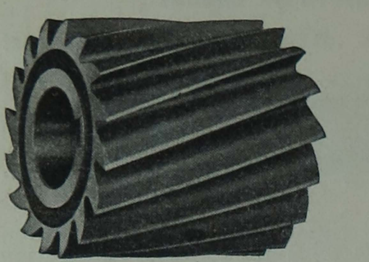


For Steel

Size Hole Inches	Carbon Steel Each	High Speed Each	Outside Diameter Inches	Length Overall Inches
3/32	$1.85	$4.25	⅝	1½
⅛	1.85	4.25	⅝	1½
5/32	1.85	4.25	⅝	1½
3/16	1.85	4.25	⅝	1½
7/32	1.85	4.25	⅝	1½
¼	1.85	4.25	⅝	1½
9/32	2.60	4.70	¾	1¾
5/16	2.60	4.70	¾	1¾
11/32	2.60	4.70	¾	1¾
⅜	3.50	5.20	1	2
7/16	3.50	5.20	1	2
½	3.50	5.20	1	2
9/16	4.00	6.85	1¼	2¼
⅝	4.00	6.85	1¼	2¼
11/16	4.60	8.45	1½	2½
¾	4.60	8.45	1½	2½
13/16	4.60	8.45	1½	2½
⅞	5.50	10.40	1¾	2¾
15/16	5.50	10.40	1¾	2¾
1	5.50	10.40	1¾	2¾

Plain Milling Cutters

Light Duty—Rake Teeth—Face Ground



Plain mills are intended for use on work of a slabbing nature when work is narrower than cutter itself. When used on flat work where there is a shoulder, lead end of spiral teeth should work in corner and for best results shallow end teeth or side chip grooves should be ground into this end.

Best suited for moderate cuts in malleable iron, steel and cast iron.

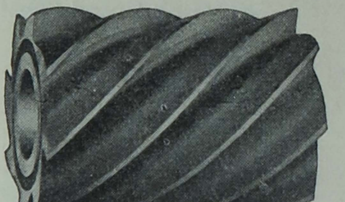
No.	High Speed Steel Each	Diam. Cutters In.	Width Face In.	Size Hole In.
A2	$4.50	2¼	* ½	⅞
A3	6.00	2¼	*1	⅞
A5	3.10	2½	* 3/16	1
A6	4.10	2½	* ¼	1
A7	4.30	2½	* 5/16	1
A8	4.60	2½	* ⅜	1
A9	4.90	2½	* 7/16	1
A10	5.10	2½	* ½	1
A12	5.60	2½	* ⅝	1
A14	6.00	2½	† ¾	1
A18	6.90	2½	†1	1
A21	8.60	2½	†1½	1
A23	10.30	2½	†2	1
A25	12.10	2½	†2½	1
A27	13.70	2½	†3	1
A55	3.80	3	† 3/16	1
A56	5.00	3	† ¼	1
A57	5.40	3	† 5/16	1
A58	5.70	3	† ⅜	1
A61	5.70	3	† ⅜	1¼
A62	6.00	3	† 7/16	1¼
A63	6.40	3	† ½	1¼

No.	High Speed Steel Each	Diam. Cutters In.	Width Face In.	Size Hole In.
A65	$6.90	3	† ⅝	1¼
A67	7.50	3	¾	1¼
A69	8.10	3	⅞	1¼
A71	8.70	3	1	1¼
A72	9.90	3	1¼	1¼
A73	11.00	3	1½	1¼
A75	13.40	3	2	1¼
A77	18.10	3	3	1¼
A105	7.10	4	¼	1
A106	7.70	4	5/16	1
A107	8.20	4	⅜	1
A108	7.10	4	¼	1¼
A109	7.70	4	5/16	1¼
A110	8.20	4	⅜	1¼
A112	9.30	4	½	1¼
A114	10.20	4	⅝	1¼
A116	11.20	4	¾	1¼
A119	13.10	4	1	1¼
A121	17.10	4	1½	1¼
A123	21.00	4	2	1¼
A125	28.90	4	3	1¼
A127	36.80	4	4	1¼

*Straight teeth and undercut sides. †Left hand spiral teeth.

Plain Milling Cutters

Heavy Duty—Rake Teeth—Face Ground



Designed for heavy cuts where an unusual amount of material is to be removed. Wide spacing of teeth makes it possible to back up or support cutting edges for heavy cuts and still have ample chip clearance.

Made with left hand spiral. Face of teeth ground.

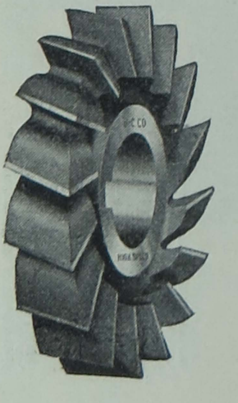
No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
A212	$10.30	2½	2	1
A215	17.30	2½	4	1¼
A227	13.40	3	2	1¼
A228	15.80	3	2½	1¼
A229	18.10	3	3	1¼
A230	22.80	3	4	1¼
.....	....	...	...	...

No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
A232	$33.60	3	6	1¼
A259	21.00	4	2	1½
A260	28.90	4	3	1½
A261	36.80	4	4	1½
A263	53.90	4	6	1½
A271	66.30	4½	6	2
A277	136.60	4½	12	2

Half Side Milling Cutters

Spiral Teeth—Rake Teeth

Side Teeth Undercut—Face Ground



Recommended for side milling and for use in pairs for straddle milling.

Greater depth of side teeth give much longer life. Furnished right or left hand.

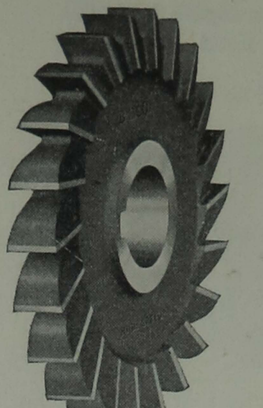
No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
B400	$13.30	4	¾	1¼
B404	18.20	5	¾	1¼
B407A	24.00	6	¾	1¼
B407	28.40	6	1	1½
B410A	34.40	7	¾	1½
B410	40.30	7	1	1½
B413A	45.70	8	¾	1½
B413	53.40	8	1	1½

Side Milling Cutters

Light Duty—Rake Teeth

Face Ground

Undercut Sides



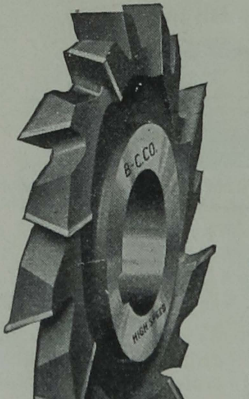
Standard side mills are made with rake teeth and undercut sides and are used for side milling, straddle milling and slotting, and do very well for light duty work. When slot is held to close limits, interlocking side mills can be used to good advantage as these can be shimmed to the correct size each time cutter is resharpened.

No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
B1	$4.20	2	3/16	½
B2	4.40	2	¼	½
B4	4.80	2	⅜	½
B5	4.20	2	3/16	⅝
B6	4.40	2	¼	⅝
B8	4.80	2	⅜	⅝
B9	5.40	2½	¼	⅞
B10	5.70	2½	5/16	⅞
B11	6.00	2½	⅜	⅞
B13	6.60	2½	½	⅞
B19	6.50	3	¼	1
B20	6.90	3	5/16	1
B21	7.20	3	⅜	1
B22	7.60	3	7/16	1
B23	8.00	3	½	1
B32A	9.00	4	¼	1
B32B	10.10	4	⅜	1
B39	11.30	4	½	1
B41	12.30	4	⅝	1
B43	13.30	4	¾	1
B45	14.30	4	⅞	1
B50A	11.30	4	½	1¼

No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
B51	$12.30	4	⅝	1¼
B51A	13.30	4	¾	1¼
B51B	14.30	4	⅞	1¼
B59A	15.10	5	½	1
B60	16.70	5	⅝	1
B62	18.20	5	¾	1
B66A	15.10	5	½	1¼
B66B	16.70	5	⅝	1¼
B67	18.20	5	¾	1¼
B67B	21.30	5	1	1¼
B70A	19.70	6	½	1
B70B	19.70	6	½	1¼
B70C	21.80	6	⅝	1¼
B71	24.00	6	¾	1
B71B	24.00	6	¾	1¼
B73A	28.40	6	1	1¼
B75A	34.40	7	¾	1¼
B76	40.30	7	1	1¼
B79	45.70	8	¾	1¼
B80	53.40	8	1	1¼
....	....	.	...	...
.....	.....	.	...	...

Staggered Tooth Side Milling Cutters

Rake Teeth—Face Ground



Ideal for deep slotting where hub of cutter is limit of depth of cut. Alternate spiral teeth combined with rake and side chip clearance give a correct cutting action and eliminate tendency to chatter. Side teeth have no cutting clearance but are made with slight undercut to recess to avoid dragging and scoring work.

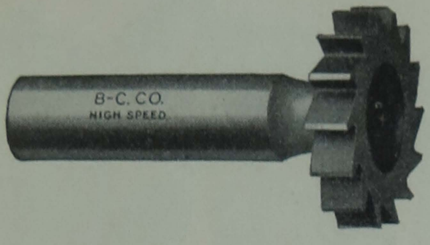
When wide slots are to be milled, ganging 2 or more cutters instead of using a wide cutter is recommended. When used in gangs, the hubs are undercut to allow the teeth to intermesh so gang can be shimmed to desired limits. The pitch of teeth in the narrower cutters being much less than the wide cutter bring many more teeth into action and the staggering of the teeth act as chip breakers.

No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
B300	$6.80	2½	¼	⅞
B301	7.10	2½	5/16	⅞
B302	7.50	2½	⅜	⅞
B303	8.30	2½	½	⅞
B304	7.80	3	3/16	1
B305	8.10	3	¼	1
B306	8.60	3	5/16	1
B307	9.00	3	⅜	1
B308	10.00	3	½	1¼
B309	10.80	3	⅝	1¼
B310	11.50	3	¾	1¼
B316	11.30	4	¼	1¼
B317	12.00	4	5/16	1¼
B318	12.60	4	⅜	1¼
B319	13.40	4	7/16	1¼
B320	14.10	4	½	1¼
B321	15.40	4	⅝	1¼

No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.	Size Hole In.
B322	$16.60	4	¾	1¼
B323	17.90	4	⅞	1¼
B324	18.90	5	½	1¼
B325	20.90	5	⅝	1¼
B326	22.80	5	¾	1¼
B327	21.80	6	⅜	1¼
B328	24.60	6	½	1¼
B329	27.30	6	⅝	1¼
B330	30.00	6	¾	1¼
B331	32.80	6	⅞	1¼
B332	35.50	6	1	1¼
B333	42.40	8	⅜	1½
B334	47.40	8	½	1½
B335	52.30	8	⅝	1½
B336	57.10	8	¾	1½
....	.....	.	...	...
....	.....	.	...	...

Woodruff Keyseat Cutters

Rake Teeth—Undercut Sides—Face Ground

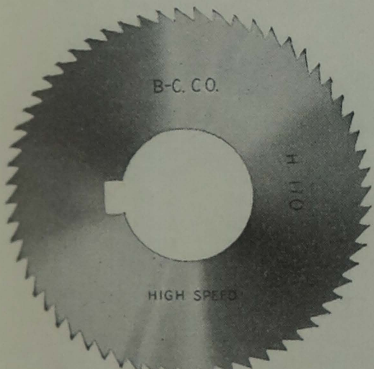


Frequently called a Keyway cutter. Carried regularly in right hand cut only. To allow for sharpening these are made with oversize diameter .010 to .020 larger than nominal dimensions shown below. All standard cutters have shank ½ inch in diameter and 2 inches long.

*No.	Cutter No.	High Speed Steel Each	Width Face In.	Diam. Cutter In.	*No.	Cutter No.	High Speed Steel Each	Diam. Cutter In.	Width Face In.
204	1	$2.80	1/16	½	808	15	$3.80	¼	1
304	2	2.80	3/32	½	809	18	4.20	¼	1⅛
305	4	2.80	3/32	⅝	810	21	4.60	¼	1¼
404	3	2.80	⅛	½	811	22	5.00	¼	1⅜
405	5	2.80	⅛	⅝	812	24	5.50	¼	1½
406	7	3.10	⅛	¾	1008	B	4.00	5/16	1
505	6	2.80	5/32	⅝	1009	C	4.40	5/16	1⅛
506	8	3.10	5/32	¾	1010	D	4.90	5/16	1¼
507	10	3.40	5/32	⅞	1011	23	5.40	5/16	1⅜
606	9	3.10	3/16	¾	1012	25	5.90	5/16	1½
607	11	3.40	3/16	⅞	1210	E	4.90	⅜	1¼
608	13	3.80	3/16	1	1211	F	5.40	⅜	1⅜
609	16	4.20	3/16	1⅛	1212	G	5.90	⅜	1½
807	A	3.40	¼	⅞	....	..	....	..	...

*These numbers have been approved by the American Standards Association. The last two digits give the nominal diameter in eighths of an inch and the digits preceding the last two give the nominal width in thirty-seconds of an inch. Thus No. 204 indicates a key 2/32x4/8 or 1/16x½ inches; No. 1210 indicates a key 12/32x10/8 or ⅜x1¼ inches.

High Speed Steel Screw Slotting Cutters



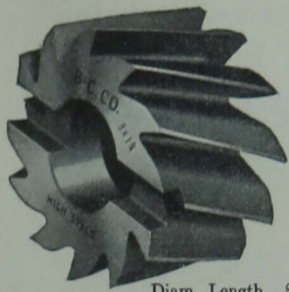
These cutters have teeth of a fine pitch especially adapted for the slotting of screw heads, slitting copper and brass tubing and other similar work.

The sides and hole are ground. The sides have a slight undercut to hole.

Made with 44 and 56 teeth.

No.	High Speed Steel Each	Diam. of Screw Head to be Slotted In.	Thickness of Cutter by Am. Std. Wire Gage No.	Thickness of Cutter In.	Diam. of Cutter In.	Diam. of Hole In.
H102	$3.20	1⅛	6	.162	2¾	1
H103	3.00	1	7	.144	2¾	1
H104	2.75	⅞	8	.128	2¾	1
H105	2.50	¾	9	.114	2¾	1
H106	2.30	⅝	10	.102	2¾	1
H107	2.05	...	11	.091	2¾	1
H108	1.90	½	12	.081	2¾	1
H109	1.90	...	13	.072	2¾	1
H110	1.80	⅜	14	.064	2¾	1
H111	1.70	11/32	15	.057	2¾	1
H112	1.60	5/16	16	.051	2¾	1
H113	1.55	9/32	17	.045	2¾	1
H114	1.50	¼	18	.040	2¾	1
H115	1.50	7/32	19	.036	2¾	1
H116	1.50	3/16	20	.032	2¾	1
H117	1.50	⅛	21	.028	2¾	1
H118	1.50	...	22	.025	2¾	1
H119	1.50	...	23	.023	2¾	1
H120	1.50	...	24	.020	2¾	1

Standard Shell End Mills



Rake Teeth, High Speed Steel

Regularly furnished right hand cut with right hand spiral and left hand cut with left hand spiral.

Furnished with sharp corners unless otherwise specified.

No.	Steel Ea.	Diam. Mill In.	Length Cut In.	Size Hole In.	No.	Steel Each	Diam. Mill In.	Length Cut In.	Size Hole In.
E150	$5.40	1¼	1	½	E170	$14.20	3	1¾	1¼
E154	6.00	1½	1⅛	½	E174	19.20	3½	1⅞	1¼
E158	6.70	1¾	1¼	¾	E178	25.50	4	2¼	1½
E162	7.70	2	1⅜	¾	E182	30.80	4½	2¼	1½
E164	9.00	2¼	1½	1	E186	36.70	5	2¼	1½
E166	10.70	2½	1⅝	1	E190	42.10	5½	2¼	2
E168	12.10	2¾	1⅝	1	E194	50.20	6	2¼	2

No. J31 Double Angle Milling Cutters

Face Ground

Have 45°, 60° and 90° included angle.
V-shaped cutters of any angle made to order.

No.		J31
High Speed Steel	each	$7.20
Diameter of Cutter	in.	2¾
Thickness	in.	½
Size of Hole	in.	1

Single Angle Milling Cutters

With Threaded Holes—Face Ground

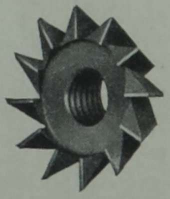
Have an included angle of 60° and made either right or left hand. Right hand cutters have right hand thread and left hand cutters have left hand thread.

No.	High Speed Steel Each	Diameter of Cutter In.	Thickness In.	Size Hole In.	Thread
J40	$5.40	1¼	7/16	⅜	24
J41	6.10	1⅝	9/16	½	20

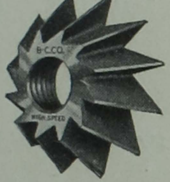
Single Angle Milling Cutters

Face Ground

Right Hand



Left Hand



Right Hand

These angular cutters of 45° and 60° included angle are suitable for cutting the teeth of milling cutters.
Can be furnished either right or left hand.

No.		J1	J2	J3
High Speed Steel	each	$6.60	7.20	8.00
Diameter of Cutter	in.	2½	2¾	3
Thickness	in.	½	½	½
Size of Hole	in.	⅞	1	1¼

Barber-Colman Hobs

Twenty-five years experience has made Barber-Colman Company one of the leaders in the manufacture of hobs, hobbing machines and other machines and small tools.

They manufacture a complete line of roughing and finishing hobs for spur and helical gears, sprockets, ratchets, splined shafts and all other hobbed forms; the tooth form is made ground or unground, as the accuracy requires.

These hobs are designed by experienced engineers, and are carefully and accurately made by trained men using specially built machinery.

Barber-Colman maintain a stock of standard hobs for immediate delivery; the sizes and list prices are given in their catalog.

Sprocket Wheel Cutters for Roller Chains

American Standard Tooth Forms

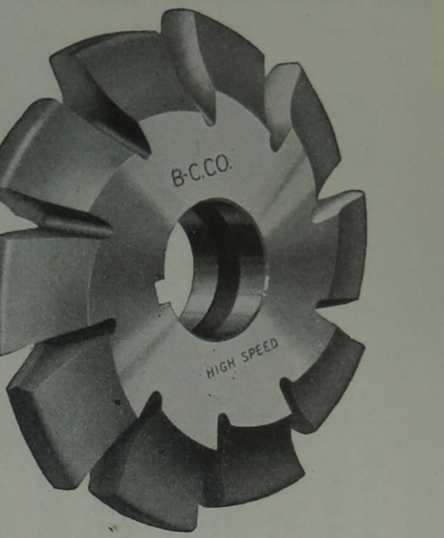
Adopted By S.A.E., A.S.M.E., A.G.M.A.

Circular Pitch Inches	Diam. of Roll Inches	Size of Hole Inches	No. of Teeth in Sprocket	Diam. of Cutter Inches	Width of Cutter Inches
3/8	.200	1	6	2 3/4	15/32
			7–8	2 3/4	15/32
			9–11	2 3/4	15/32
			12–17	2 3/4	7/16
			18–34	2 3/4	7/16
			35 & over	2 3/4	13/32
1/2–5/8	.313	1	6	3	3/4
			7–8	3	3/4
			9–11	3 1/8	3/4
			12–17	3 1/8	3/4
			18–34	3 1/8	23/32
			35 & over	3 1/8	11/16
5/8	.400	1	6	3 1/8	3/4
			7–8	3 1/8	3/4
			9–11	3 1/4	3/4
			12–17	3 1/4	3/4
			18–34	3 1/4	23/32
			35 & over	3 1/4	11/16
3/4	.469	1	6	3 1/4	29/32
			7–8	3 1/4	29/32
			9–11	3 3/8	29/32
			12–17	3 3/8	7/8
			18–34	3 3/8	27/32
			35 & over	3 3/8	13/16
1	.563	1 1/4	6	3 3/4	1 1/4
			7–8	3 7/8	1 1/4
			9–11	3 7/8	1 3/16
			12–17	4	1 5/32
			18–34	4	1 1/8
			35 & over	4	1 3/32
1–1 1/4	.625	1 1/4	6	3 7/8	1 1/2
			7–8	4	1 1/2
			9–11	4 1/8	1 15/32
			12–17	4 1/8	1 15/32
			18–34	4 1/4	1 13/32
			35 & over	4 1/4	1 11/32
1 1/4–1 1/2	.750	1 1/4	6	4 1/4	1 13/16
			7–8	4 3/8	1 13/16
			9–11	4 1/2	1 25/32
			12–17	4 1/2	1 3/4
			18–34	4 5/8	1 11/16
			35 & over	4 5/8	1 5/8
1 1/2	.875	1 1/4	6	4 3/8	1 13/16
			7–8	4 1/2	1 13/16
			9–11	4 5/8	1 25/32
			12–17	4 5/8	1 3/4
			18–34	4 3/4	1 11/16
			35 & over	4 3/4	1 5/8
1 3/4	1.000	1 1/2	6	5	2 3/32
			7–8	5 1/8	2 3/32
			9–11	5 1/4	2 1/16
			12–17	5 3/8	2 1/32
			18–34	5 1/2	1 31/32
			35 & over	5 1/2	1 7/8
2	1.125	1 1/2	6	5 3/8	2 13/32
			7–8	5 1/2	2 13/32
			9–11	5 5/8	2 3/8
			12–17	5 3/4	2 5/16
			18–34	5 7/8	2 1/4
			35 & over	5 7/8	2 5/32
2 1/2	1.563	1 3/4	6	6 3/8	3
			7–8	6 5/8	3
			9–11	6 3/4	2 15/16
			12–17	6 7/8	2 29/32
			18–34	7	2 3/4
			35 & over	7 1/8	2 11/16
3	1.900	2	6	7 1/2	3 19/32
			7–8	7 3/4	3 19/32
			9–11	7 7/8	3 17/32
			12–17	8	3 15/32
			18–34	8	3 11/32
			35 & over	8 1/4	3 7/32

Prices upon application.

Involute Gear Cutters

For Teeth of Gear Wheels—Radial Teeth



Eight cutters are made for each pitch, as follows:

No. 1 will cut gears from 135 teeth to a rack.
No. 2 will cut gears from 55 teeth to 134 teeth.
No. 3 will cut gears from 35 teeth to 54 teeth.
No. 4 will cut gears from 26 teeth to 34 teeth.
No. 5 will cut gears from 21 teeth to 25 teeth.
No. 6 will cut gears from 17 teeth to 20 teeth.
No. 7 will cut gears from 14 teeth to 16 teeth.
No. 8 will cut gears from 12 teeth to 13 teeth.

Gears cut with cutters of the same pitch are interchangeable.

All gear cutters have formed teeth and can be sharpened without changing their outline.

Special cutters for exact number of teeth made to order.

When ordering give range number of Cutter, diametral pitch, pressure angle and sizes of hole and keyway required. Always state whether range cutter or single purpose cutter for exact number of teeth is wanted.

Diametral Pitch	High Speed Steel Each	Diam. Cutter In.	Size Hole In.	Diametral Pitch	High Speed Steel Each	Diam. Cutter In.	Size Hole In.
*1	$151.80	8 1/2	2	12	$7.20	2 1/4	7/8
*1 1/4	118.30	7 3/4	2	14	6.90	2 1/8	7/8
*1 1/2	77.80	7	1 3/4	16	6.90	2 1/8	7/8
1 3/4	60.40	6 1/2	1 3/4	18	6.20	2	7/8
2	44.50	5 3/4	1 1/2	20	6.20	2	7/8
2 1/2	40.00	5 3/4	1 1/2	22	6.20	2	7/8
3	25.10	4 3/4	1 1/4	24	6.00	1 3/4	7/8
4	19.20	4 1/4	1 1/4	26	5.80	1 3/4	7/8
5	15.50	3 3/4	1 1/4	28	5.80	1 3/4	7/8
6	12.30	3 1/8	1	30	5.80	1 3/4	7/8
7	10.70	2 7/8	1	32	5.80	1 3/4	7/8
8	10.20	2 7/8	1	36	5.80	1 3/4	7/8
9	9.00	2 3/4	1	40	5.80	1 3/4	7/8
10	8.20	2 3/8	7/8	48	5.80	1 3/4	7/8
11	7.90	2 3/8	7/8	..	....	...	.

1-Inch Hole, 1/4x3/32-Inch Keyway

Diametral Pitch	High Speed Steel Each	Diam. Cutter In.	Diametral Pitch	High Speed Steel Each	Diam Cutter In.
4	$16.40	3 5/8	16	$7.60	2 1/2
5	14.30	3 3/8	18	7.60	2 3/8
10	9.00	2 3/4	20	7.60	2 3/8
11	8.60	2 5/8	22	6.90	2 1/4
12	8.60	2 5/8	24	6.90	2 1/4
14	7.60	2 1/2	..	....	...

1 1/4-Inch Hole, 5/16x1/8-Inch Keyway

6	$13.40	3 1/2	9	$10.70	3 1/8
7	12.60	3 3/8	10	9.80	3
8	11.10	3 1/4	12	9.40	2 7/8

1 1/2-Inch Hole, 3/8x5/32-Inch Keyway

3	$29.00	5 1/4	6	$15.70	3 7/8
4	20.70	4 1/2	7	13.50	3 5/8
5	18.00	4 1/4	8	12.10	3 1/2

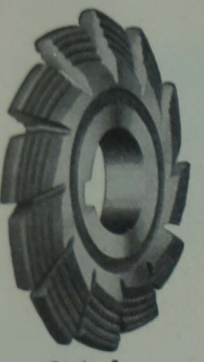
1 3/4-Inch Hole, 7/16x3/16-Inch Keyway

2	$52.60	6 1/2	4	$22.20	4 3/4
2 1/2	47.30	6 1/8	5	19.40	4 3/8
3	35.50	5 5/8	6	16.80	4 1/4

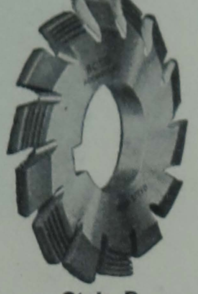
*Made to order only.

Stocking Cutters for Involute Gears

Rake Teeth



Style A



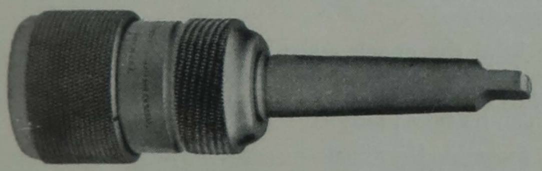
Style B

For use in roughing out the teeth in gear blanks and so designed as to be used at high speed. Style A has steps on all the teeth and on both sides. Style B is stepped on one side of the tooth only, alternately and is supplied for cutters of 6 pitch and finer only. Style A is used for all other pitches. Style A is furnished as standard, Style B made to order only.

For other sizes, prices upon application.

Diametral Pitch	High Speed Steel Each	Diameter Cutter Inches	Size Hole Inches
1	**$151.80**	8½	2
1¼	**118.30**	7¾	2
1½	**77.80**	7	1¾
1¾	**60.40**	6½	1¾
2	**44.50**	5¾	1½
2½	**40.00**	5¾	1½
3	**25.10**	4¾	1¼
4	**19.20**	4¼	1¼
5	**15.50**	3¾	1¼
6	**12.30**	3⅛	1
7	**10.70**	2⅞	1
8	**10.20**	2⅞	1

Lee Keyless Drill Chucks



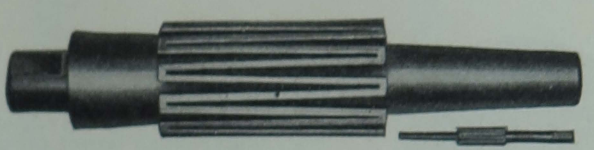
This chuck speeds up the changing of tools and permits the use of straight, blacksmith or taper shanks on the same chuck. Drills and reamers of any type shank are easily inserted and securely held by turning the knurled tightening collar. The 3 steel jaws grip any type of shank the full length of the jaws and are guaranteed not to slip.

Standard Morse Taper Arbors are used with these chucks, as some chucks require male, and others female ends, but it is recommended that arbors are ordered with the chucks.

Chucks can be easily installed on any portable electric drill by using a sleeve in place of an arbor. The electric drill is then ready for a tool with any type shank that it is desired to use. Specify size and make of electric drill to obtain size sleeve required.

No.	Description	Each
A-450	¼ Keyless Drill Chuck	**$7.50**
A-450-A	No. 1 M.T. Arbor	**.80**
A-450-B	No. 2 M.T. Arbor	**1.00**
A-460	⅜ Keyless Drill Chuck	**9.00**
A-460-A	No. 1 M.T. Arbor	**.80**
A-460-B	No. 2 M.T. Arbor	**1.00**
A-470	½-0 Keyless Drill Chuck	**12.00**
A-470-A	No. 2 M.T. Arbor	**1.00**
A-470-B	No. 3 M.T. Arbor	**1.50**
A-480	⅝-3/16 Keyless Drill Chuck	**12.00**
A-480-A	No. 2 M.T. Arbor	**1.00**
A-480-B	No. 3 M.T. Arbor	**1.50**
A-490	⅞-¼ Keyless Drill Chuck	**20.00**
A-490-A	No. 3 M.T. Arbor	**1.50**
A-490-B	No. 4 M.T. Arbor	**2.00**

Knock-Out Expanding Mandrels



The Knock-Out Expanding Mandrel is suitable for all classes of work, large or small, also any kind of material. It holds work without distortion, even thin tubes or bushings. Has no jaws to distort or injure work. Permits overhanging of work when facing ends, avoiding possibility of damaging mandrel. Holds work any length of bore. Has an exceptionally large range for each size. Because of the simple design, it is lighter and more easily handled than a solid mandrel; no difficulty in releasing work.

This mandrel is made of tool steel, hardened and finished ground.

Mandrels Complete

No.	Each	Range Inches	No.	Each	Range Inches
M0	**$4.00**	⅜ to ½	M5C	**$37.00**	3¼ to 4
M1	**4.00**	½ to 11/16	M5	**54.00**	2½ to 4
M2	**6.00**	11/16 to 1	M6B	**57.00**	4 to 4¾
M3	**11.00**	1 to 1 9/16	M6C	**70.00**	4¾ to 5½
M4	**20.00**	1 9/16 to 2½	M6	**92.00**	4 to 5½
M5B	**32.00**	2½ to 3¼	....	.....	....

Mandrel Parts

Arbors Only				Sleeves Only				Auxiliary Centers	
No.	Each	Length Inches	Weight Pounds	No.	Each	Length Inches	Weight Pounds	No.	Each
M0A	**$1.75**	4½	⅛	M0S	**$1.75**	1¼	1/32	M0AC	**$.50**
M1A	**1.75**	5¾	¼	M1S	**1.75**	1½	1/16	M1AC	**.60**
M2A	**2.75**	9¼	¾	M2S	**2.75**	2½	⅛	M2AC	**.75**
M3A	**5.00**	12¼	2¼	M3S	**5.00**	3¼	⅜	M3AC	**1.00**
M4A	**11.00**	16¾	7½	M4S	**7.50**	4 11/16	1¼	M4AC	**1.50**
M5A	**15.00**	17¾	12¼	M5S	**15.00**	7	5	M5AC	**2.00**
M5-6A	**22.00**	18	25¼	M5S	**15.00**	7	5	......	....
M5A M5-6A	**37.00**	....	37½	M5S	**15.00**	7	5	M5AC	**2.00**
M5-6A	**22.00**	18	25¼	M6S	**35.00**	7	12	......	....
M6A	**35.00**	18¼	40	M6S	**35.00**	7	12	......	....
M5-6A M6A	**57.00**	....	65¼	M6S	**35.00**	7	12	......	....

Note.—Nos. M5 and M6 have 2 arbors each to obtain maximum expansion; arbor No. M5-6A being used with both mandrels. Nos. M5 and M6C will furnish complete range of both mandrels.

Mandrel Sets

No. M100

No. M100 set consists of mandrels Nos. M0, M1, M2 and M3, range ⅜ to 1 9/16 inches. Packed in No. M101 mandrel set box, which provides room for No. M4 mandrel should it be purchased later.

Shipping weight 9 pounds per set.

No. **M100**, Complete with No. M101B Box.....each **$25.00**

No. M101

A practical set for smaller shops. It consists of 5 small mandrels, Nos. M0, M1, M2, M3 and M4, range ⅜ to 2½ inches. Packed in a durable metal case.

Shipping weight 18 pounds per set.

No. **M101**, Complete with No. M101B Box.....each **$45.00**

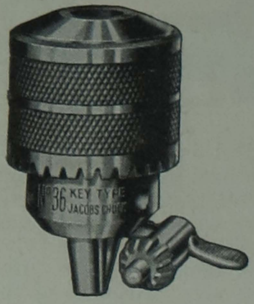
No. M102

This is a special set consisting of the 2 large mandrels, Nos. M5 and M6. It contains sleeves Nos. M5S and M6S and arbors Nos. M5A, M5-6A, M6A. It is especially adapted for cylinder sleeve machining and other large work. Range 2½ to 5½ inches. Packed in durable metal cases.

Shipping weight 120 pounds per set.

No. **M102**, Complete with No. M102B Box....each **$124.00**

Jacobs Improved Drill Chucks



Recommended for use on portable drills, drill presses, bench grinders and tapping devices. A combination of simplicity, ruggedness, and gripping power for sensitive high speed or any other form of light precision drilling.

The toothed sleeve and key distinguishes this chuck. By means of this key a drill tap or other tool can be easily and securely tightened.

Chucks may be taken apart by forcing sleeve off over jaw end of chuck, when nut may be taken out, leaving jaws free to be removed.

Light Duty Models

Model No.	Capacity Inches	Taper Hole No.	Each	Keys Each	Jaws & Nuts per Set	Sleeves Each
0	0–1/8	0	$6.00	$.30	$2.25	$.60
1A	0–1/4	1	4.50	.30	1.75	.50
2A	0–3/8	2	5.50	.40	2.25	.60
33	1/16–1/2	33	6.50	.40	2.50	.60
6A	0–1/2	33	7.50	.50	2.75	.90
1B	0–1/4	*3/8″x24p	4.50	.30	1.75	.50
2B	0–3/8	*1/2″x20 *5/8″x16	5.50	.40	2.25	.60
33B	1/16–1/2	*5/8″x16	6.50	.40	2.50	.60

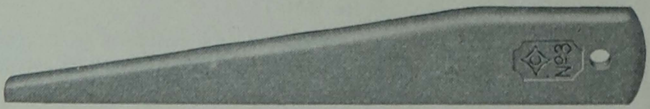
Medium Duty Models

Model No.	Capacity Inches	Taper Hole No.	Each	Keys Each	Jaws & Nuts per Set	Sleeves Each
7	0–1/4	2	$4.50	$.30	$1.75	$.50
30	0–5/16	2	5.50	.40	2.25	.60
32	0–3/8	2	5.50	.40	2.25	.60
34	0–1/2	6	7.50	.50	2.75	.90
3	0–17/32	3	9.00	.50	3.25	.90
3A	1/8–5/8	3	9.00	.50	3.25	.90
36	3/16–3/4	3	12.00	.75	4.25	1.20
7B	0–1/4	*3/8″x24 *1/2″x20	4.50	.30	1.75	.50
30B	0–5/16	*3/8″x24 *1/2″x20	5.50	.40	2.25	.60
32B	0–3/8	*1/2″x20 *5/8″x16 *45/64″x16	5.50	.40	2.25	.60
34B	0–1/2	*5/8″x16 *3/4″x16 *45/64″x16	7.50	.50	2.75	.90
3B	1/8–5/8	*5/8″x16 *3/4″x16 *45/64″x16	9.00	.50	3.25	.90
36B	3/16–3/4	*5/8″x16 *3/4″x16	12.00	.75	4.25	1.20

*Threaded.

Parts for B threaded chucks are interchangeable with the tapered chucks.

No. 105 Cleveland Drifts or Center Keys

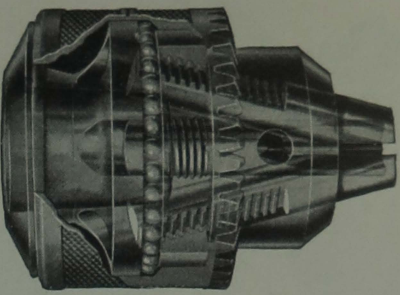


This key is drop forged and hammered.

Size No.	Description	Price Each
1	Fitting No. 1 Sockets and Sleeves	$.30
2	Fitting No. 2 Sockets and Sleeves	.35
3	Fitting No. 3 Sockets and Sleeves	.40
4	Fitting No. 4, 5 and 6 Sockets and Sleeves	.50

Always give the list number when ordering.

Jacobs Super Drill Chucks



The Jacobs Ball Bearing Super Chuck is recommended for use in the machine shop and tool room—on drilling machines, lathes, screw machines and on every drilling operation requiring gripping power, accuracy and the highest degree of wearing quality. The ball bearings eliminate friction making this chuck easy to operate. It may be tightened by hand for ordinary drilling and tool work and only a slight pressure on the spiral gear key is necessary for the heaviest drilling. This chuck is interchangeable on all present Jacobs equipped spindles.

Model No.	Each	Capacity Inches	Taper No.
8½	$6.00	0–1/4	2
9	7.00	0–5/16	2
11	8.00	0–3/8	2
14	10.00	0–1/2	3
16	12.50	1/16–5/8	3
18	15.00	1/16–3/4	4
20	20.00	3/8–1	5

Repairs for Jacobs Super Drill Chucks

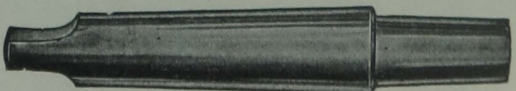
The Jacobs Super Drill Chuck can be readily taken apart and assembled.

To take the chuck apart, press the sleeve off over the front (or jaw end) of the body, remove balls from race through slot in body, leaving nut free to be removed when jaws can be taken out.

To assemble the chuck, insert the 3 jaws in body according to corresponding numbers on same, advance jaws partly, apply a good grade of grease to the thread on the nut and place it in position to engage the jaws, then feed balls into ball race through slot in body, apply good grease to balls, press on sleeve with an arbor press.

Model No.	8½	9	11	14	16	18	20
Keys....each	$.40	$.40	$.40	$.50	$.75	$.75	$1.25
Jaws and Nuts..per set	2.25	2.75	3.00	3.25	4.25	5.25	7.50
Sleeves....each	.60	.75	.75	.90	1.20	1.50	2.25
Balls....per set	.30	.45	.45	.60	.75	.75	.90

Arbors for Jacobs Chucks



Arbors furnished to fit standard makes of machine tools.

Morse Taper No.	Diameter Straight Shank Inches	Price, Each	
		Morse Taper	Straight Shank
1	..	$.80	...
2	..	.80	...
3	..	1.20	...
4	..	2.00	...
5	..	3.50	...
...	1/2	....	$.75
...	5/8	....	.75

Prices for Brown & Sharpe, Jarno, and special tapers upon application.

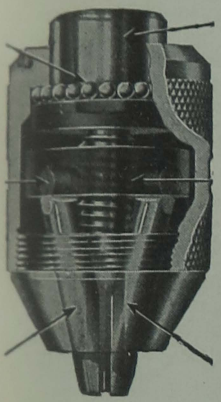
Jacobs Portomatic Chucks

Keyless

Jacobs Portomatic Chuck is designed for portable drill use and machine drilling where the keyless or self-tightening feature is required.

Ball bearing, rapid in action, powerful, yet easily released by a slight twist of the knurled sleeve. Has a tremendous grip which automatically tightens with increased load.

Furnished in all standard tapers and threads, and interchangeable on all present Jacobs equipped spindles.



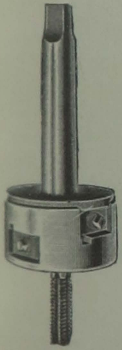
Cat. No.	Each	Capacity Inches	Taper No.
250	$5.00	0–1/4	2
312	6.00	0–5/16	2
375	6.00	0–3/8	2
500	10.00	1/16–1/2	6

Cat. No.	Each	Capacity Inches	Thread
250B	$5.00	0–1/4	3/8x24P 1/2x20P
312B	6.00	0–5/16	3/8x24P 1/2x20P
375B	6.00	0–3/8	1/2x20P 5/8x16P
500B	10.00	1/16–1/2	5/8x16P 45/64x16P

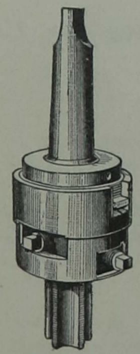
Parts

Chuck Model	Screws Each	Jaws per Set	Carriers Each	Collars Each	Balls per Set
250	$1.00	$1.25	$.75	$.50	$.30
312	1.25	1.50	1.00	.50	.45
375	1.25	1.50	1.00	.50	.45
500	2.00	2.50	1.50	1.00	.60

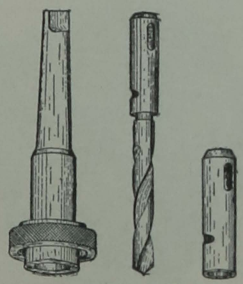
Errington Self-Centering Tapping Chucks



Style F
Positive Tap Holder



Style G
Friction Tap Holder



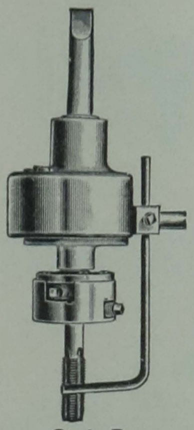
Style E-P
Positive Ball-Drive Tool-Holder

The Errington Tap Holder is self-centering. Two universal dogs, placed one above the other center the tool with the direct pressure of two set screws against wide V surfaces. Grip square head of tap in upper jaw with flat against end of upper screw, then tighten up lower jaw on round shank. Round part of shank must not reach up past the end of the upper screw.

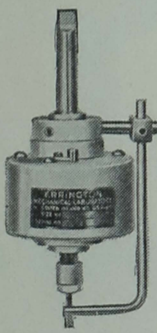
Size No.	Size Taps, In. Standard	Size Taps, In. Pipe	Morse Taper Shank No.	Style F Each	Style G Each	Style E-P Each	Extra Collets M.T. (Net) Each
00	1/16— 3/8	...	1, 2	$6.00	$10.00	......	.....
0	1/8— 5/8	1/4	3, 2, (1*)	9.00	15.00	$10.00	.....
1	1/4— 3/4	1/2	3, 4	12.50	20.00	20.00	$2.00
2	5/16—1	1/2	4, (3*)	15.00	22.50	25.00	2.50
3	5/8—1 1/4	1	4, (3*)	17.50	25.00	30.00	3.00
4	5/8—1 1/2	1 1/4	5, 4	20.00	27.50	40.00	4.00
5	3/4—2	2	5, (4*)	25.00	30.00	60.00	7.00

The first size of Morse Taper Shank given above for each size is the one regularly furnished; the other sizes can be furnished but the sizes marked (*) are too small to be used unless re-enforced by a set screw.

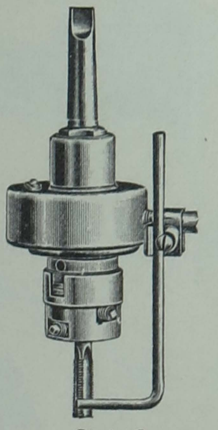
Errington Auto-Reverse Tapping Chucks



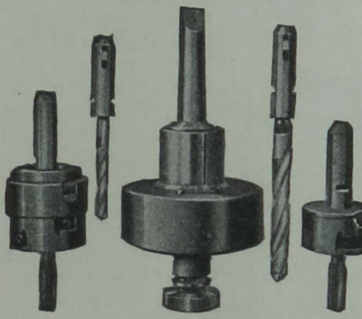
Style B
Positive Tap Holder and Stop



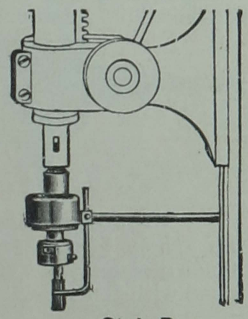
Cone Drive, Ball-Bearing



Style C
Graduated Friction Tap Holder and Stop



Style D-E
Positive Quick-Change Ball-Drive with Two Drill-Collets



Style B
Attached to Sensitive Drill Press

The Style B stop holds the work down while the clutches disengage. Where the work is easily handled and centered, the simplest form is recommended.

Only one hand is required to operate the Errington, leaving the other free to handle duplicate parts in bulk.

On a multiple spindle drill it is just the thing for drilling and tapping in one handling castings, jigwork, etc., on such work as typewriters, sewing machines, cash registers, etc.

Wherever the work is too heavy to center itself to the tap, and wherever the work is clamped down, the saving in time and the accuracy in fit and alignment secured by drilling, facing, tapping, and stud-setting in line are as great as those similarly obtained by the turret lathe work.

Tapping chucks require no reversing mechanism on drill press. The different styles are secured by inserting the duplex tap chucks desired, without changing steel spur quick-reverse gear.

Specify Style B, where the work is drilled and then rehandled and tapped.

Specify Style C, for tapping steel, copper, etc., wherever there is danger of breaking taps.

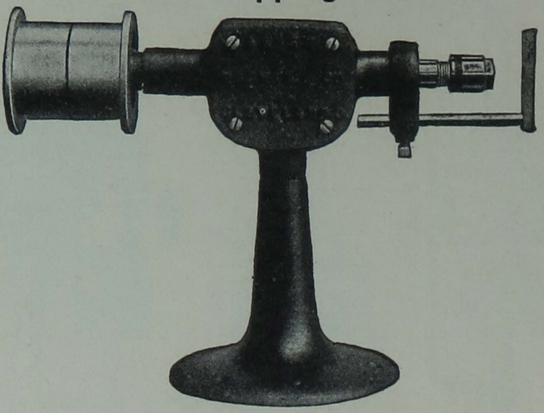
Specify Style D-E with quick-change tool-holders to drill, tap and set studs, etc., without moving work, or stopping or reversing machine. Individual friction adjustment in each tap-holder if required.

**Cone-Drive, ball-bearing.

Size No.	Size Taps, In. Exact Size	Size Taps, In. Pipe Size	Morse Taper Shank No.	Style B Positive Tap-Holder and Stop Each	Style C Friction Tap-Holder and Stop Each	Style D-E Positive Quick-change Ball-Drive with Two drill-Collets (No Tap-Holder) Each
0H.S.**	0 to 1/2	...	....	......	$50.00	......
00**	0 to 1/4	...	....	......	35.00	......
00 H.S.	Up to 3/16	...	Almond, 1	$25.00	30.00	......
00	1/16— 5/16	...	1, 2	25.00	30.00	......
0	1/8— 5/8	1/4	3, 2, (1*)	30.00	35.00	$35.00
1	1/4— 3/4	1/2	3, 4, (2*)	35.00	40.00	40.00
2	5/16—1	1/2	4, (3*)	40.00	50.00	50.00
3	5/8—1 1/4	1	4, (3*)	50.00	60.00	60.00
4	5/8—1 1/2	1 1/4	5, 4	70.00	80.00	80.00
5	3/4—2	2	5, (4*)	80.00	90.00	90.00

The first size of Morse Taper Shank given above for each size is the one regularly furnished; the other sizes can be furnished but the sizes marked (*) are too small to be used unless re-enforced by a set-screw.

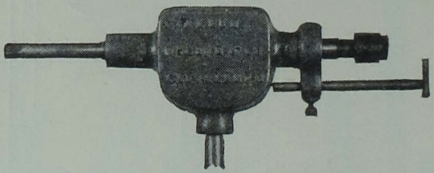
No. 1 Allen Tapping Machines



No. 1 Tapping Machine

The No. 1 Tapping Machine taps a hole up to ¼ inch. It is fitted with a trump chuck and provided with an adjustable reversing device. Tight and loose pulleys, 6-inch diameter, are furnished with machine which is mounted on a pedestal.

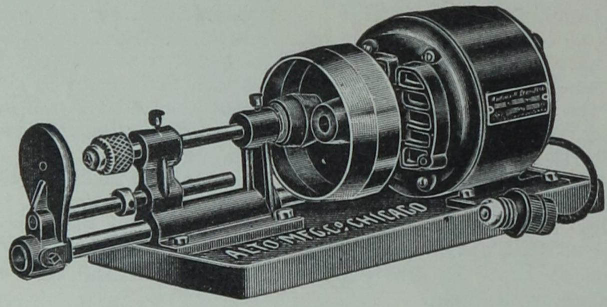
The No. 2 Tapping Machine will tap a hole ⅝ inch and under. Tight and loose pulleys, 8-inch diameter, are furnished. Tapping attachment is provided with taper shank and is for use in lathe or drill press.



No. 1 Tapping Attachment

Price, No. 1 Tapping Machine		each	$25.00
" " 2 " "		"	30.00
" " 1 " Attachment		"	24.00
" " 2 " "		"	29.00
" Countershaft		"	15.00

No. 1 Alto Motor Driven High Speed Tapping Machines



This machine is simple to operate. The work is placed on the face plate (to which jigs may be attached) and pushed against the tap. This engages the driving clutch and threads the tap into the work. When tap has reached the proper depth (which may be governed by the depth stop) the operator pulls slightly on the work, this engages the reversing clutch which backs out tap. Has cone friction drive, which enables the operator to tap to the bottom of a hole without danger of breaking the tap.

Has the proper speed forward, but three times faster reverse and no lost motion when reversing tap.

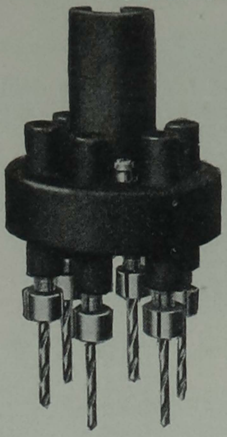
The machine is all complete in itself and needs only to be connected to a light socket to be ready for operation.

Capacity, 0 to 3/16-inch in brass. Correspondingly smaller in steel.

When ordering this machine, specify whether A.C. or D.C. current and the voltage required.

		Speed					
No.	Lgth. In.	Motor R.P.M.	Tap Forward R.P.M.	Tap Reverse R.P.M.	Capacity Inches	Weight Pounds Crated	With A.C. Motor and Chuck Each
1	19½	1725	1450	5000	0 to 3/16	60	$45.00

Hoefer Auxiliary Drilling Heads

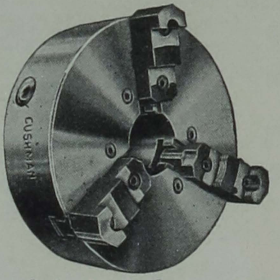


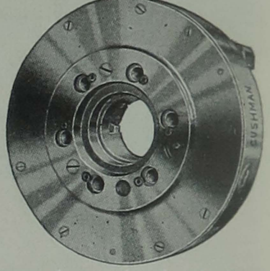
Auxiliary drilling heads make it possible to drill the number of holes for which the head is designed in the time required for a single hole, thus cutting production costs.

All gears are cut integral with their spindles and are encased in an oil-proof case. These spindles are made of a high grade alloy steel, accurately ground and fitted with a ball thrust bearing. The head has been designed with a long sleeve which is clamped securely on the sleeve of the spindle.

The illustration shows but one of the designs. Send blue prints or sketch with inquiry showing number, sizes and center distances of holes to be drilled. Prices upon application.

Cushman Proposed National Standardized Lathe Chucks

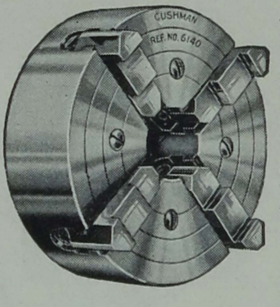




Only for lathes equipped with proposed standard spindles; Chuck has back so formed as to permit direct attachment to taper spindle nose. Built in medium and heavy duty weights. Two or 3-jaw self-centering chucks; 4-jaw independent chucks; 4-jaw combination self-centering-independent chucks. Prices upon application.

Cushman Independent Lathe Chucks

4-Jaw—No. 14, Iron Body—No. 214, Steel Body

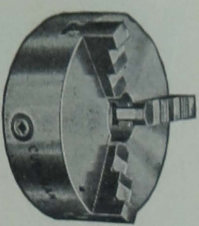


For general purpose lathes, as work of almost any shape, of a size that does not greatly exceed that of chuck, can be chucked in them. Bodies are either gray iron or cast steel, formed like a truss and practically unbreakable. Jaws are steel and are reversible, perfectly aligned with body ribs which are of unusual width and strength.

All surfaces are hard, and being ground to standard gauges, jaws are interchangeable with others of corresponding sizes.

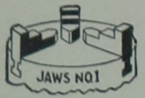
Size Inches	No. 14 Iron Body Each	No. 214 Steel Body Each	Diameter Hole Inches	Diameter Recess Inches	Approx. Ship. Wt., Lbs.
4½	$27.00	......	1	4.118	10
6	32.00	......	1 9/16	5.618	18
8	37.00	$61.00	2	4.715	41
9	40.00	......	2	4.715	47
10	47.00	72.00	2½	5.618	67
12	56.00	91.00	3	6.666	87
14	61.00	104.00	3	6.666	106
15	67.00	112.00	3½	7.799	123
16	72.00	117.00	3½	7.799	127
18	93.00	141.00	4	9.509	220
20	107.00	163.00	4	9.509	246
22	124.00	181.00	4½	11.012	276
24	139.00	204.00	5	11.012	309
26	156.00	233.00	5	12.000	370
28	177.00	277.00	5	13.005	421
30	220.00	324.00	6	15.025	507
36	320.00	493.00	6	17.740	638

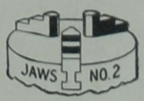
Cushman 3-Jaw Geared Scroll Lathe Chucks



The bodies of sizes from 3 to 6 inches inclusive are made only from machinery steel; for larger chucks up to 24 inches, a fine grade of gray iron castings is used, except for those which have to withstand the excessive strain of unusually heavy work, the bodies are of forged steel.

Chucks over 6 inches have one-piece bodies; back plates are fitted to bodies on two diameters and doweled.





Hard stepped one-piece jaws.

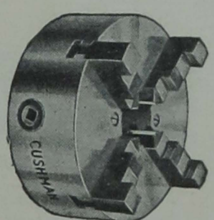
Style 1 outside jaws have longest step nearest periphery of chuck. Style 2 inside jaws have longest step nearest to center of chuck.

Nos. 31A and 231A chucks are furnished with Style 1 jaws; Nos. 32A and 232A, with Style 2 jaws: Nos. 34A and 234A with Styles 1 and 2 jaws.

	Each						
	Iron Bodies		Steel Bodies				
Size Inches	Nos. 31A and 32A	No. 34A	Nos. 231A and 232A	No. 234A	Diam. Hole In.	Diam. Recess In.	Approx. Ship. Wt. Lbs.
3	$25.00	$29.00	$25.00	$29.00	5/8	2.812	3
4	29.00	33.00	29.00	33.00	1	3.045	8
5	32.00	36.00	32.00	36.00	1 1/4	3.691	12
6	36.00	41.00	36.00	41.00	1 9/16	4.715	20
7 1/2	41.00	48.00	63.00	69.00	2	4.715	32
9	49.00	57.00	77.00	85.00	2 1/2	6.987	62
10 1/2	56.00	64.00	85.00	93.00	3	6.987	77
12	65.00	75.00	103.00	112.00	3	6.987	110
15	93.00	107.00	136.00	149.00	3 1/4	6.987	159

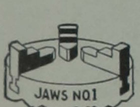
18, 21 and 24-inch chucks are furnished in another model. Information and prices on application.

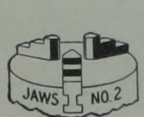
Cushman 4-Jaw Geared Scroll Lathe Chucks



The bodies of sizes from 3 to 6 inches inclusive are made only from machinery steel; for larger chucks up to 24 inches, a fine grade of gray iron castings is used, except for those which have to withstand the excessive strain of unusually heavy work, the bodies are of forged steel.

Chucks over 6 inches have one-piece bodies; back plates are fitted to bodies on two diameters and doweled.





Hard stepped one-piece jaws.

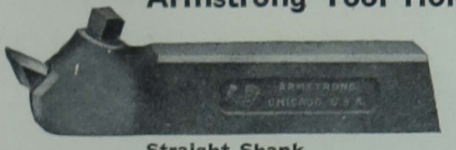
Style 1 outside jaws have longest step nearest periphery of chuck. Style 2 inside jaws have longest step nearest to center of chuck.

Nos. 41A and 241A chucks are furnished with Style 1 jaws; Nos. 42A and 242A, with Style 2 jaws; Nos. 44A and 244A with Styles 1 and 2 jaws.

	Each						
	Iron Bodies		Steel Bodies				
Size Inches	Nos. 41A and 42A	No. 44A	Nos. 241A and 242A	No. 244A	Diam. Hole In.	Diam. Recess In.	Approx. Ship. Wt. Lbs.
3	$28.00	$32.00	$28.00	$32.00	5/8	2.812	3
4	32.00	36.00	32.00	36.00	1	3.045	9
5	36.00	40.00	36.00	40.00	1 1/4	3.691	13
6	40.00	45.00	40.00	45.00	1 9/16	4.715	22
7 1/2	47.00	53.00	71.00	77.00	2	4.715	36
9	57.00	64.00	87.00	93.00	2 1/2	6.987	64
10 1/2	63.00	71.00	97.00	104.00	3	6.987	81
12	73.00	83.00	115.00	124.00	3	6.987	118
15	101.00	115.00	148.00	161.00	3 1/4	6.987	165

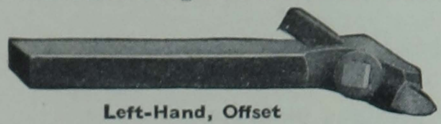
18, 21 and 24-inch chucks are furnished in another model. Information and prices on application.

Armstrong Tool Holders



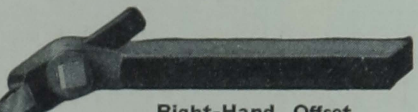
Straight Shank

Armstrong Tools form a practical and economical system for the use of self-hardening and high speed steel.



Left-Hand, Offset

One Armstrong Tool Holder with a few cutters will do any job on the lathe or shaper; roughing, facing, finishing, corner and fillet work. They save all forging and 70 per cent of grinding.



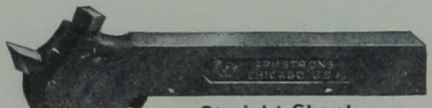
Right-Hand, Offset

Cutters made from stock size and shape of steel.

Armstrong Tools make 1 pound of high speed steel equal 10 pounds of ordinary forged tools. Price includes wrench and one high speed cutter bit.

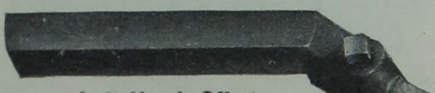
No.						
Left-Hand	Straight Shank	Right-Hand	Each	Extra Cutter Bits, High Speed, Each	Size Holder Inches	Size Cutter In. Sq.
000-L	000-S	000-R	$2.70	$.15	5/16 x 1/2 x 4	3/16
00-L	00-S	00-R	2.70	.15	5/16 x 3/4 x 4 1/2	3/16
0-L	0-S	0-R	2.85	.20	3/8 x 7/8 x 5	1/4
1-L	1-S	1-R	3.25	.35	1/2 x 1 1/8 x 6	5/16
2-L	2-S	2-R	4.00	.55	5/8 x 1 3/8 x 7	3/8
3-L	3-S	3-R	5.40	.90	3/4 x 1 5/8 x 8	7/16
4-L	4-S	4-R	6.90	1.30	7/8 x 1 3/4 x 9	1/2
5-L	5-S	5-R	9.75	2.35	1 x 2 x 11	5/8
6-L	6-S	6-R	13.50	3.85	1 1/4 x 2 1/4 x 13	3/4
7-L	7-S	7-R	22.50	5.85	1 1/2 x 2 1/2 x 16	7/8
750-L	750-S	750-R	33.00	8.35	1 5/8 x 2 3/4 x 18	1
800-L	800-S	800-R	42.75	11.35	1 3/4 x 3 x 20	1 1/8

Armstrong Drop-Head Tool Holders



Straight Shank

Designed especially for use on lathes of British and European make, and American lathes of similar design with high slide rest or low centers.



Left-Hand, Offset

The head and screw are extra heavy and the gooseneck shape of holder makes it an excellent shaper and planer tool. It is drop forged from a special steel which combines stiffness and strength to a remarkable degree, and is accurately machined, heat treated and hardened. The set screws are made of treated alloy steel with hardened point and are practically unbreakable.

Right-Hand, Offset

Each tool holder is boxed separately and the price includes one high speed cutter bit.

No.						
Left-Hand	Straight Shank	Right-Hand	Size Holder Inches	Size Cutter In. Sq.	Price Each	Price, Extra Cutter Bits, High Speed, Each
100-L	100-S	100-R	1/2 x 5/8 x 6	3/16	$2.70	$.15
101-L	101-S	101-R	5/8 x 3/4 x 7 1/2	1/4	2.85	.20
201-L	201-S	201-R	3/4 x 7/8 x 8 1/2	5/16	3.25	.35
102-L	102-S	102-R	7/8 x 1 x 9 1/2	3/8	4.00	.55
301-L	301-S	301-R	1 x 1 1/8 x 10 1/2	7/16	5.40	.90
103-L	103-S	103-R	1 1/8 x 1 1/4 x 11 1/2	1/2	6.90	1.30
104-L	104-S	104-R	1 3/8 x 1 1/2 x 13 1/2	5/8	9.75	2.35
105-L	105-S	105-R	1 5/8 x 1 3/4 x 15 1/2	3/4	13.50	3.85
106-L	106-S	106-R	1 7/8 x 2 x 17 1/2	7/8	22.50	5.85
107-L	107-S	107-R	2 1/8 x 2 1/4 x 19 1/2	1	33.00	8.35

Armstrong Carbide Tool Holders

Designed for holding carbide cutter bits.

They are drop forged of special steel and heat treated. The cutter is held parallel with the shank of the tool. High speed steel cutter bits can also be used.

Furnished for holding either square of flat cutter bits.

Price includes wrench but no cutter bit.

Straight Shank

Square Cutter No.	Square Cutter Each	Flat Cutter No.	Flat Cutter Each	Size of Holder Inches	Size of Cutter Inches Square	Size of Cutter Inches Flat	Weight Pounds
T-0-S	$3.20	FT-0-S	$3.80	⅜x15/16x 6	¼	¼x⅜	1¼
T-1-S	3.60	FT-1-S	4.40	½x1¼x 7	5/16	5/16x7/16	2
T-2-S	4.50	FT-2-S	5.40	⅝x1½x 8	⅜	⅜x½	3¼
T-3-S	6.00	FT-3-S	7.20	¾x1¾x 9	7/16	7/16x9/16	5
T-4-S	7.60	FT-4-S	9.20	⅞x1⅞x10	½	½x¾	7
T-5-S	10.80	FT-5-S	12.90	1 x2⅛x12	⅝	⅝x⅞	10½

Right-Hand Off-Set

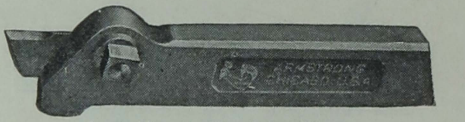
Square Cutter No.	Square Cutter Each	Flat Cutter No.	Flat Cutter Each	Size of Holder Inches	Size of Cutter Inches Square	Size of Cutter Inches Flat	Weight Pounds
T-0-R	$3.20	FT-0-R	$3.80	⅜x15/16x 6	¼	¼x⅜	1¼
T-1-R	3.60	FT-1-R	4.40	½x1¼x 7	5/16	5/16x7/16	2
T-2-R	4.50	FT-2-R	5.40	⅝x1½x 8	⅜	⅜x½	3¼
T-3-R	6.00	FT-3-R	7.20	¾x1¾x 9	7/16	7/16x9/16	5
T-4-R	7.60	FT-4-R	9.20	⅞x1⅞x10	½	½x¾	7
T-5-R	10.80	FT-5-R	12.90	1 x2⅛x12	⅝	⅝x⅞	10½

Left Hand Off-Set

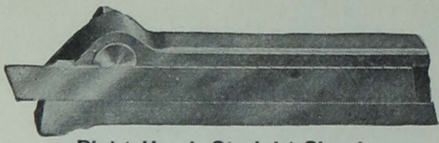
Square Cutter No.	Square Cutter Each	Flat Cutter No.	Flat Cutter Each	Size of Holder Inches	Size of Cutter Inches Square	Size of Cutter Inches Flat	Weight Pounds
T-0-L	$3.20	FT-0-L	$3.80	⅜x15/16x 6	¼	¼x⅜	1¼
T-1-L	3.60	FT-1-L	4.40	½x1¼x 7	5/16	5/16x7/16	2
T-2-L	4.50	FT-2-L	5.40	⅝x1½x 8	⅜	⅜x½	3¼
T-3-L	6.00	FT-3-L	7.20	¾x1¾x 9	7/16	7/16x9/16	5
T-4-L	7.60	FT-4-L	9.20	⅞x1⅞x10	½	½x¾	7
T-5-L	10.80	FT-5-L	12.90	1 x2⅛x12	⅝	⅝x⅞	10½

Armstrong Side Tools

The Armstrong Straight Shank Side Tool will be found exceptionally convenient and efficient.



Left Hand, Straight Shank



Right Hand, Straight Shank

This tool is well adapted for use on the planer and shaper for many classes of work.

The design embodies the prime needs of a practical lathe tool. As the cutter is adjustable to any desired clearance, the greatest possible support is obtainable under all conditions.

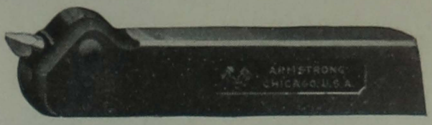
The cutters are beveled on both sides and are held at an angle giving the side clearance and top rake needed to obtain a clean, smooth cut.

Right Hand, Offset

Each of these tools is boxed separately and the price includes a wrench and one high speed cutter.

No. Straight L. H.	No. Straight R. H.	No. Offset L. H.	No. Offset R. H.	Size Shank, In.	Size Cutters, In.	Each	Extra Cutters High Speed, Ea.
79-L	79-R	69-L	69-R	5/16x ¾	⅛x ½	$2.85	$.60
80-L	80-R	70-L	70-R	⅜x ⅞	5/32x ⅝	3.40	.90
81-L	81-R	71-L	71-R	½x1⅛	3/16x ¾	4.35	1.40
82-L	82-R	72-L	72-R	⅝x1⅜	¼x ⅞	6.00	2.30
83-L	83-R	73-L	73-R	¾x1⅝	5/16x1	7.85	3.40
84-L	84-R	74-L	74-R	⅞x1¾	⅜x1¼	10.65	5.00
85-L	85-R	75-L	75-R	1 x2	7/16x1⅜	12.75	6.00
86-L	86-R	76-L	76-R	1¼x2¼	½x1½	16.50	7.90

Armstrong Round Cutter Tool Holders

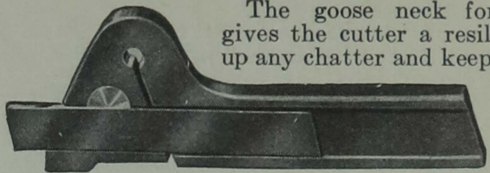


The convenience and economy of this tool will recommend it wherever a single tool is required to do a large variety of lathe and shaper work.

The cutter is round, and rake and clearance can be altered instantly by rotating the cutter in its socket. The cutter is held solidly by a tapered tool steel key. Price includes one high speed cutter bit.

No.	Each	Extra Cutter Bits, High Speed, Ea.	Size Holder Inches	Size Cutter Inches
120	$2.35	$.15	⅜x ¾x 5	¼
121	2.60	.30	½x1 x 6	5/16
122	3.20	.50	⅝x1¼x 7	⅜
123	4.20	.75	¾x1½x 8	7/16
124	5.50	1.00	⅞x1⅝x 9	½
125	6.85	1.95	1 x1¾x11	⅝

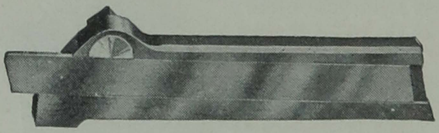
Armstrong Spring Cutting-Off Tools



The goose neck form of this tool gives the cutter a resiliency that takes up any chatter and keeps the work from climbing up on tool. Cutter is beveled on both sides and held at an angle, giving the side clearance and top rake needed to obtain a clean, smooth job. Packed 1 in box. Price includes wrench and 1 high speed cutter.

Size Shank Inches	Size Cutter Inches	Weight Pounds Each	No. Left Hand Offset	No. Straight	No. Right Hand Offset	Tool Complete Each	Extra Cutters Each
⅜x ⅞	3/32x ⅝	¾	S-30L	S-20	S-30R	$4.50	$.65
½x1⅛	⅛x ¾	1½	S-31L	S-21	S-31R	5.40	.90
⅝x1⅜	⅛x ⅞	2¼	S-32L	S-22	S-32R	6.75	1.30
¾x1⅝	3/16x1	3½	S-33L	S-23	S-33R	9.00	2.15

Armstrong Cutting-Off Tools



Straight Shank

In no other form of forged lathe tool is the proportionate cost of the maintenance compared with effective work done so great as in the cutting-off tool.

As cutter is adjustable to any desired clearance the greatest possible support is obtainable under all conditions.

Left-Hand, Offset

Right-Hand, Offset

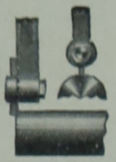
The cutters are beveled on both sides and are held at an angle, giving the side clearance and top rake needed to obtain a clean smooth cut.

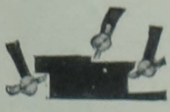
Price includes wrench and one high speed cutter.

No. Left-Hand	No. Straight Shank	No. Right-Hand	Each	Extra Cutters High Speed Each	Size Shank Inches	Size Cutter Inches
29-L	19	29-R	$2.85	$.60	5/16x ¾	3/32x ½
30-L	20	30-R	3.00	.65	⅜x ⅞	3/32x ⅝
31-L	21	31-R	3.60	.90	½x1⅛	⅛x ¾
32-L	22	32-R	4.50	1.30	⅝x1⅜	⅛x ⅞
33-L	23	33-R	6.00	2.15	¾x1⅝	3/16x1
34-L	24	34-R	7.50	2.90	⅞x1¾	3/16x1⅛
35-L	25	35-R	9.75	4.00	1 x2	¼x1¼
36-L	26	36-R	11.65	4.65	1¼x2¼	¼x1⅜

Armstrong Planer and Shaper Tools

ARMSTRONG
CHICAGO U.S.A.


Cutting Keyway with Cutter Reversed


At Work in Close Quarters

The second illustration shows the tool cutting a keyway with the cutter reversed and the tool turned around, thus allowing the cutting point behind center of tool and working as a gooseneck tool.

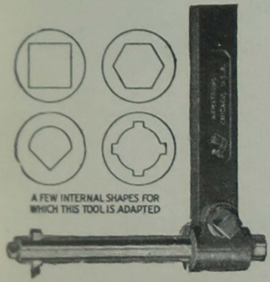
The last illustration shows the tool at work in close quarters, giving a good general idea of clearance obtained. It also shows a few of the angles at which cutter can be set.

Prices include wrench and high speed cutter.

No.	Each	Extra Cutter Bits High Speed, Each	Size Holder Inches	Size Cutter Inches
* 40	$4.65	$.35	½x1 x 6	¼x ⅜
*401	6.00	.55	⅝x1¼x 8½	5/16x 7/16
* 41	7.85	.80	¾x1½x10	⅜x ½
42	12.40	1.95	1⅛x1¾x13	½x ¾
43	21.75	3.35	1⅜x2 x16	⅝x ⅞
44	39.00	5.00	1⅞x2¼x19	¾x1
45	57.00	8.20	2⅛x2¾x22	⅞x1⅛

*Shaper sizes.

Armstrong Extension Shaper Tools

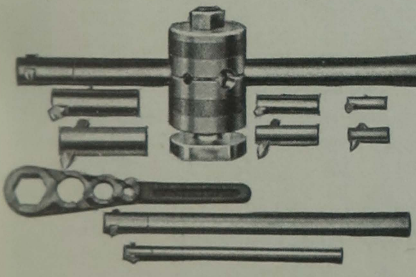

A FEW INTERNAL SHAPES FOR WHICH THIS TOOL IS ADAPTED

An extremely rigid and convenient tool, well adapted for die work or for any kind of work on the shaper where extra clearance is needed.

Price includes holder and one bar, one high speed cutter and one wrench.

No.	Size Shank Inches	Size Bar Inches	Size Cutter In. Sq.	Price Each	Extra Cutter Bits High Speed, Each
47	½x1⅛	¾x10	5/16	$4.50	$.24
48	⅝x1⅜	15/16x12	⅜	5.65	.40
49	¾x1⅝	1⅛x14	7/16	8.00	.55

Armstrong Three-Bar Boring Tools



Bolt head and bottom part of holder are made of ample size to allow for fitting, which is necessary on account of great variation in height of centers above slide rest and differences in sizes of T slots.

Prices include holder; 3 bars with 30°, 45° and 90° end caps; 9 high speed cutters and combination wrench.

No.	Each	Diam. Bar. In.	Size Cutter, In. Sq.
0-BB	$14.00	*⅜, ½ and ¾	3/16 and ¼
1-B	22.50	½, ¾ and 1⅛	3/16, ¼ and ⅜
2-B	30.00	9/16, 15/16 and 1 5/16	3/16, 5/16 and 7/16
3-B	52.50	¾, 1⅛ and 1½	¼, ⅜ and ½
4-B	75.00	15/16, 1 5/16 and 1 13/16	5/16, 7/16 and ⅝

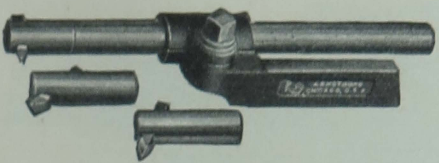
Extra High Speed Cutter Bits

Size..........in. sq.	3/16	¼	5/16	⅜	7/16	½	⅝
90°..............each	$.10	$.12	$.24	$.40	$.55	$.80	$1.40
45° and 30°......each	.10	.18	.30	.50	.75	1.00	1.80

*⅜-inch bar is solid.

An extra charge of $2.00 is made for tools Nos. 1-B and up when ordered fitted to special dimensions. Fitting charge for No. O-BB, $.75 extra.

Armstrong Boring Tools



Each tool is boxed separately. Price includes holder and bar, 90°, 45° and 30° end caps, 3 high speed cutters and double head wrench.

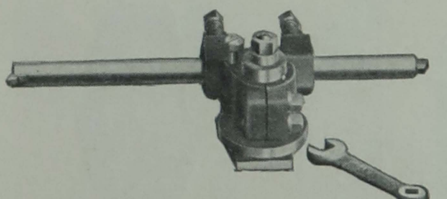
No.	Complete Each	Extra Cutter Bits 90° Each	Extra Cutter Bits 45° and 30° Each	Size Shank Inches	Diam. Bar Inches	Size Cutter Square Inch	Wt., Lbs.
00B	$4.90	$.10	$.10	5/16x ¾	½	3/16	1½
8	4.90	.10	.10	⅜x ⅞	9/16	3/16	1¾
9	5.80	.12	.18	½x1⅛	¾	¼	3¾
10	7.65	.24	.30	⅝x1⅜	15/16	5/16	6½
11	10.85	.40	.50	¾x1⅝	1⅛	⅜	11
12	16.00	.55	.75	⅞x1¾	1 5/16	7/16	17
13	22.50	.80	1.00	1 x2	1½	½	25

Armstrong Boring Tool Holders

Reversible and can be used for right or left-hand. Price includes holder, wrench, two boring bars and one cutter.

No.	Size Shank Inches	Size Bar Inches	Size Cutter In. Sq.	Each	Extra Cutter Bits, High Speed, Ea.	Extra Boring Bars Diam. Inches	Extra Boring Bars Each
15	⅜x ¾	⅛ and ¼	¼	$4.15	$.20	⅛	$.30
16	½x1	3/16 and 5/16	5/16	5.25	.35	3/16	.40
17	⅝x1¼	¼ and ⅜	⅜	6.75	.55	¼	.50
18	¾x1½	5/16 and 7/16	7/16	8.65	.90	5/16	.60
..	......	....	..	....	...	⅜	.80
..	......	....	..	....	...	7/16	1.10

Armstrong Adjustable Boring Tools



This tool is well adapted to a wide range of work.

The holder is easily adjustable to different heights and will hold bars of various diameters.

Price includes holder, one bar, two high speed cutters and wrench.

No.	Each	Extra Cutter Bits High Sp. Ea.	Capacity Diam. Bar, Inches	Size Bar Inches	Size Cutter In. Sq.
212	$27.00	$.50	¼ to 1 5/16	1 5/16 x21	⅜
213	37.50	.75	⅜ to 1½	1½ x24	7/16
214	60.00	1.00	½ to 1 13/16	1 13/16x28	½
215	90.00	1.80	⅝ to 2¼	2¼ x36	⅝

Extra charge for fitting bolt head to special dimensions.

Armstrong Boring Tools

ARMSTRONG
CHICAGO U.S.A.

Designed for use on lathes having clamp tool rest.

Price includes holder and bar, 90, 45 and 30-degree end caps, three high speed cutters and double head wrench.

No.	Each	Extra Cutter Bits, H.S. Ea. 90°	Extra Cutter Bits, H.S. Ea. 45,° 30°	Size Shank Inches	Size Bar Inches	Size Cutter In. Sq.
108	$4.15	$.10	$.10	¾x ⅞	9/16x 9	3/16
109	4.90	.12	.18	1 x1⅛	¾x11	¼
110	6.50	.24	.30	1¼x1⅜	15/16x13	5/16
111	9.40	.40	.50	1½x1⅝	1⅛ x16	⅜
112	13.50	.55	.75	1¾x1⅞	1 5/16 x18	7/16
113	18.00	.80	1.00	2 x2⅛	1½ x21	½
114	27.00	1.40	1.80	2¼x2⅜	1 13/16x24	⅝
115	45.00	2.75	3.40	2¾x2⅞	2¼ x30	¾

Armstrong Threading Tools

ARMSTRONG
CHICAGO, U.S.A.

The cutters require grinding on the top edge only to sharpen, and therefore remain true to form and of the correct angle. Its use thus insures good thread and saves much grinding. Price includes one single point cutter V, U. S. or Whitworth Standard, and wrench. Tools equipped with single point V cutter will be shipped unless otherwise ordered.

No.	Size Tool Inches	Price, with High Speed Cutter, Each	No.	Size Tool Inches	Price, with High Speed Cutter, Each
00T	5/16x 3/4x5	$4.15	53	3/4x1 5/8x 8	$8.25
50	3/8x 7/8x5	4.15	54	7/8x1 3/4x 9	9.75
51	1/2x1 1/8x6	5.00	55	1 x2 x10	12.40
52	5/8x1 3/8x7	6.40	..	....	.....

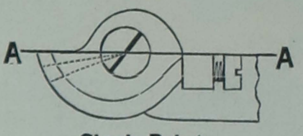
Armstrong Knurling Tools

ARMSTRONG
CHICAGO, U.S.A.

Self centering and knuckle or joint has ample bearing to resist the severe strains of both end and side thrust. Knurls and pins made of tool steel suitably tempered. All other parts are drop-forged or bar steel, hardened. Knurls can be furnished coarse, medium and fine, in either straight line or diamond pattern. Medium diamond knurls will be sent with tool unless otherwise ordered.

No.	Complete	Extra Knurls Per Pr.	Size Holder Inches	Dimensions, Knurls Inches			Wt. Lbs. Each	Knurling Cap. Diam. In.
				Diam.	Face	Hole		
00-K	$5.65	$1.00	5/16x 3/4x5	5/8	3/16	7/32	5/8	1/8 up
0-K	6.00	1.00	3/8x 7/8x5 1/2	5/8	3/16	7/32	7/8	1/8 up
1-K	6.75	1.15	1/2x1 1/8x6 1/2	3/4	1/4	1/4	1 1/2	3/16 up
2-K	8.00	1.15	5/8x1 3/8x7 1/2	3/4	1/4	1/4	2	3/16 up
4-K	14.00	2.00	7/8x1 3/4x9	1	1/4	5/16	4	1/4 up

Armstrong Threading Tool Cutters



Single Point

Chaser

When grinding and adjusting cutters always grind the cutter on a line from the point to the center, as indicated by the dotted lines in the outline view of the cutter.

The cutters used in the Armstrong Threading Tool require grinding on the top edge only, to sharpen, and therefore always remain true to form and of correct angle; its use thus insures perfect fitting threads, and saves much grinding, as well as dispensing entirely with forging and tempering.

Adjust the cutter so that the newly ground cutting edge represented by dotted lines is in a horizontal position or parallel to the line A. A. When fastening the cutter in position, first see that the adjusting screw is set against heel of cutter before pulling up the nut.

Made from high speed steel.

Sharp V, Whitworth or U. S. Standard Thread.

For Tool No.	Single Point Each	Chaser Each	For Tool No.	Single Point Only Each
00T	$2.65	$4.15	53	$5.25
50	2.65	4.15	54	5.25
51	3.15	5.00	55	6.40
52	4.15	6.40	..	....

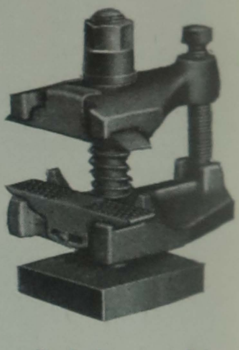
When ordering cutters or chasers (except single point V cutters) it is necessary to specify exact pitch or number of threads per inch.

Armstrong Planer Jacks

Designed to displace the haphazard devices and methods quite generally in use for leveling work on machine tools, and a glance will show any mechanic its convenience and utility. A set on a machine will greatly reduce the proportion of time required for preliminary arrangements as compared with the actual machine time on the job, and will, moreover, by its perfect adjustment and solidity, insure good, true surfaced work.

No.	Height, Inches Closed	Height, Inches Open	Price Each	No.	Height, Inches Closed	Height, Inches Open	Price Each
1	2 3/4	3 3/4	$1.90	3	5 1/4	7 1/2	$4.50
2	3 3/4	5 1/4	3.00	4	7 1/2	12	8.65

Armstrong Improved Lathe Tool Posts



Combines the strength and holding power of the strap and stud tool clamp with the convenience of the open side and ordinary set screw tool post.

It is stronger and stiffer than the ordinary tool post, will not slip nor chatter and consequently will do more accurate work.

As there is no side projection, it is peculiarly adapted to working close up to the chuck.

The open side design permits rapid and convenient change and adjustment of tools.

No.	For Lathes Swing, In.	Price Each	No.	For Lathes Swing, In.	Price Each
1-T	12 to 14	$8.25	3-T	20 to 22	$13.50
2-T	16 to 18	10.50	4-T	24 to 32	18.00

Armstrong Non-skid Jacks

Neither base nor screw revolves, only nut turns.

Vertical Jack

Vertical Jacks

No.	Height, In. Shortest	Height, In. Extended	Diam. Screw In.	Wt. Lbs.	Price Each
351	2 3/4	4	5/8	1 1/2	$1.30
352	4	7 1/4	5/8	2	2.00
353	6 3/4	12	3/4	5 1/4	3.00
354	8 3/4	15	1	7	4.50

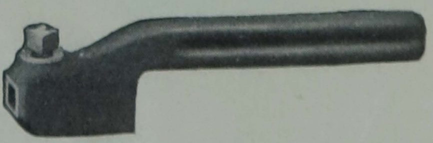
Bracing Jacks

No.	Height, In. Shortest	Height, In. Extended	Diam. Screw In.	Wt. Lbs.	Price Each
361	3 3/4	6	5/8	1	$1.20
362	4 3/4	8	5/8	1 1/2	1.85
363	6 3/4	12	3/4	2 3/4	2.75
364	8 3/4	16	3/4	4	3.75

Bracing Jack

Armstrong Holders

For Grinding Cutters



In many shops where Armstrong Tool Holders are in use, the practice prevails of sharpening cutters without removing them from the holder, and as a result the holder is often ruined, the metal being cut away from the front end of the holder until it becomes too weak to support the strain of a heavy cut. This holder is designed to obviate this trouble.

No.	Holds Cutters Inches	Price Each	No.	Holds Cutters Inches	Price Each
1-G	3/16 and 1/4	$.90	4-G	5/8 and 3/4	$2.25
2-G	5/16 and 3/8	1.20	5-G	7/8, 1 and 1 1/8	3.40
3-G	7/16 and 1/2	1.50	...	....	....

Standard Classification of High Speed and High Alloy Tool Steel Extras

For All Tool steel containing 3% or more of Tungsten and Molybdenum or 8% or more of Chromium, with or without additional alloys.

Extras for Quantity

These extras are applicable to individual items of a size of a grade ordered at one time for shipment at one time.

Wt. Lbs.	Extra per Lb.	Wt. Lbs.	Extra per Lb.	Wt. Lbs.	Extra per Lb.
1000 of a Size		400 to 499	$.02	50 to 99	$.09
or Over	Base	300 to 399	.03	25 to 49	.12
750 to 999	$.00½	200 to 299	.05	Under 25	.15
500 to 749	.01	100 to 199	.07	....	...

Round, Octagon and Hexagon

All intermediate sizes take next higher extra.
Base sizes 1½ to 2¾ inches inclusive.

Size Inches	Extra per Lb.	Size Inches	Extra per Lb.	Size Inches	Extra per Lb.
¼ and 9/32	$.09	1 to 1 15/32	$.00¾	5⅛ to 6	$.06
5/16 and 11/32	.07½	1½ to 2¾	Base	6⅛ to 7	.08
⅜ to 15/32	.04½	2 13/16 to 3	.01½	7⅛ to 8	.10
½ to 19/32	.03	3 1/16 to 4	.04	8⅛ to 10	.13
⅝ to 31/32	.01½	4⅛ to 5	.05	....	...

Squares and Flats

Intermediate sizes take the next higher extra.

Width Section Inches	Extras in Cents per Pound — Thickness of Section, Inches													
	⅛	3/16	¼	5/16	⅜	½	⅝	¾	1	1¼	1½	1¾	2	2½	3
¼	60	40	20	..	..	..	..	..	..	..	..	..	..	..	..
5/16	50	30	16	13	..	..	..	..	..	..	..	..	..	..	..
⅜	40	20	12	10	8	..	..	..	..	..	..	..	..	..	..
½	20	14	10	8	6	4	4	..	..	..	..	..	..	..	..
¾	14	10	8	6	4	3	2	2	..	..	..	..	..	..	..
1	12	8	6	4	3	2	1	1	1	..	..	..	..	..	..
1¼	10	6	4	3	2	2	1	1	1	1	..	..	..	..	..
1½	10	6	3	2	2	1	B	B	B	B	B	..	..	..	..
1¾	10	6	3	2	2	1	B	B	B	B	B	B	..	..	..
2	10	6	3	2	2	1	B	B	B	B	B	B	B	..	..
2¼	10	6	3	2	2	1	B	B	B	B	B	B	B	..	..
2½	10	6	3	2	2	1	B	B	B	B	B	B	B	B	..
3	10	6	3	2	2	1	B	B	B	B	B	2	2	2	2
4	10	6	3	2	2	2	2	2	2	2	2	3	3	3	3
5	12	8	5	4	4	4	4	4	4	4	4	4	4	4	4
6	16	12	8	7	6	6	6	6	6	5	5	5	5	5	5
7	20	16	12	10	8	6	6	6	6	5	5	5	5	5	5
8	..	..	..	12	10	8	8	8	7	6	5	5	5	5	5
9	..	..	..	..	..	10	10	10	8	7	6	6	6	6	6
10	..	..	..	..	..	12	12	12	9	7	6	6	6	6	6
11	..	..	..	..	..	14	14	14	10	8	7	7	7	7	7
12	..	..	..	..	..	16	16	16	11	9	8	8	8	8	8

Extras for Machine Cutting and for Wastage

Rounds Up to 2 In. Inc., All Squares, Flats and Other Shapes

Length of Cut Inches	Per Lb.	Length of Cut Inches	Per Lb.
¼ to under 5/16	$.65	2 to under 2¼	$.11
5/16 to under ⅜	.60	2¼ to under 2½	.10
⅜ to under 7/16	.55	2½ to under 2¾	.09
7/16 to under ½	.50	2¾ to under 3	.08
½ to under 9/16	.45	3 to under 3¼	.07½
9/16 to under ⅝	.40	3¼ to under 3½	.07
⅝ to under 11/16	.36	3½ to under 3¾	.06½
11/16 to under ¾	.33	3¾ to under 4	.06
¾ to under ⅞	.30	4 to under 5	.05½
⅞ to under 1	.26	5 to under 6	.05
1 to under 1⅛	.23	6 to under 7	.04½
1⅛ to under 1¼	.20	7 to under 8	.04
1¼ to under 1⅜	.18	8 to under 10	.03½
1⅜ to under 1½	.16	10 to under 14	.03
1½ to under 1⅝	.15	14 to under 24	.03½
1⅝ to under 1¾	.14	24 to under 36	.04
1¾ to under 1⅞	.13	36 to under 108	.05
1⅞ to under 2	.12	108 and over	.02

Annealing

Annealing..............................per pound $.02

Rex High Speed Tool Steel

Crucible Steel Company of America
Pittsburgh, Pennsylvania.
United States of America
"REX AA" HIGH SPEED STEEL

Made in two grades Rex AA and Rex AAA.
Carried in popular treated sizes about 3 feet long.
Also in annealed sizes in commercial lengths.
For prices see high speed tool steel classification.

Rex 95 Bits

A Cobalt high speed steel for cutting hard material. Excellent for finishing cuts; has great resistance to wear. Can be used at high speed on heat-treated alloy steels, also for machining manganese steel castings.

Suggestions for Hardening

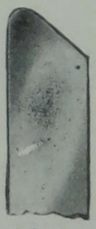
Preheat sections up to about 1 inch 1400°-1500° F. Larger sections 1500°-1600° F. Final heat 2340°-2370° F. aiming 2350° F. Cool in warm oil or air blast for sections up to ¾ inch. Larger sections must be cooled in air blast. Temper at 1050° F. to 1090° F. for an hour or longer, depending on hardness desired.

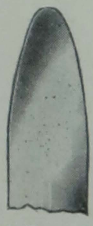
Standard tool holder lengths, hardened and ground all over in 5 and 10-pound boxes, single or assorted sizes. Cut to 30° bevel ends.

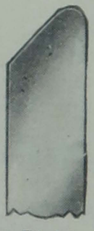
Size (Square)...in.	¼	5/16	⅜	7/16	½	⅝	¾	⅞	1
Length.........in.	2	2½	3	3½	4	4½	5	6	7
No. to Pound.....	20	13	8	5	3	2	*1	†1	‡1

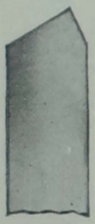
Approximate Weight: *⅞ pound; †1½ pounds; ‡2⅛ pounds.

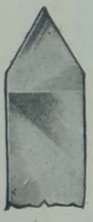
Armstrong Tool Holder Cutters


1-Left Hand Turning Tool

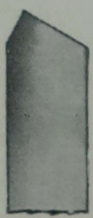

2-Round Nose Turning Tool

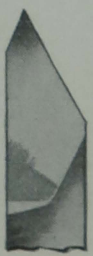

3-Right Hand Turning Tool

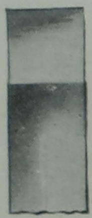

4-Left Hand Turning Tool

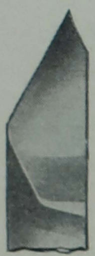

5 Threading Tool

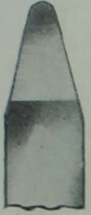
These cutters are made from the best Armstrong high speed steel, heat treated; ground to form shown and ready for use.


6-Right Hand Corner Tool


7-Left Hand Side Tool


8 Square Nose Tool


9-Right Hand Side Tool

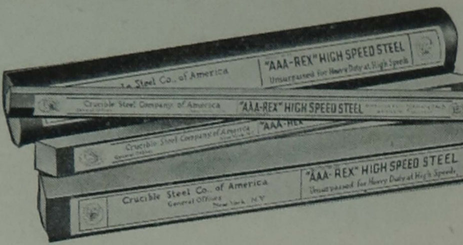

10 Brass Tool

Size Sq. In.	Price Each	Size Sq. In.	Price Each	Size Sq. In.	Price Each
3/16	$.25	7/16	$1.00	⅞	$6.00
¼	.30	½	1.45	1	8.60
5/16	.45	⅝	2.50	1⅛	11.90
⅜	.65	¾	4.10	...	.....

Specify numbers in ordering.

High Speed Steel Treated Bits for Tool Holders

Rex AA, Rex AAA and Rex 95



These bits fit securely and can be made rigid in any of the standard makes of tool holders.

All bits should be ground thoroughly before using.

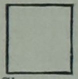
Lengths shown in table (with 30-degree bevel on each end) will be furnished, unless otherwise specified. Special sizes, shapes and lengths can be furnished.

In boxes of about 5 pounds of a size.

Rex AA is a standard high speed tool steel.

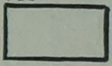
Rex AAA is a cobalt high speed steel recommended for extra heavy service.

Rex 95 is a cobalt high speed steel for cutting hard material. Excellent for finishing cuts; has great resistance to wear. Can be used at high speed on heat-treated alloy steels, also for machining manganese steel castings.



Square for Turning and Boring Tools

Size Inches	Each	Length Inches	Size Inches	Each	Length Inches	Size Inches	Each	Length Inches
3/16	$.15	2½	⅜	$.55	3	9/16	....	4
¼	.20	2½	7/16	.90	3½	⅝	$2.35	4½
5/16	.35	2½	½	1.30	4	¾	3.85	5



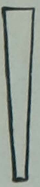
Flat for Planer and Slotter Tools

For Planer Tools			For Slotter and Gang Planer Tools		
Size Inches	Each	Length Inches	Size Inches	Each	Length Inches
¼ x ⅜	$.35	2½	7/16 x 9/16	$1.20	3½
5/16 x 7/16	.55	3	½ x 11/16	1.60	3¾
⅜ x ½	.80	3½	9/16 x ¾	2.20	4¼
½ x ¾	1.95	4¼	⅝ x ⅞	3.35	5
⅝ x ⅞	3.35	5	¾ x 1	5.00	5¾
¾ x 1	5.00	6	⅜ x ½	.70	3
⅞ x 1⅛	8.20	7	½ x 11/16	1.50	3½
....	....	...	⅝ x ⅞	2.55	4

Round for Turning Tools

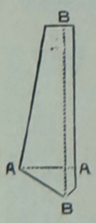
Size, Inches	Each	Length, Inches
¼	$.15	2⅜
5/16	.30	3
⅜	.50	3½
7/16	.75	3⅞
½	1.00	4½
⅝	1.95	5½

Bevel for Cutting-Off Tools



Size, Inches	Each	Length, Inches
3/32 x ½	$.40	4½
3/32 x ⅝	.40	5
⅛ x ¾	.65	6
⅛ x ⅞	.95	7
3/16 x 1	1.75	8
3/16 x 1⅛	2.20	9
¼ x 1¼	3.40	10
¼ x 1⅜	4.00	11

Special Shape for Side Tools

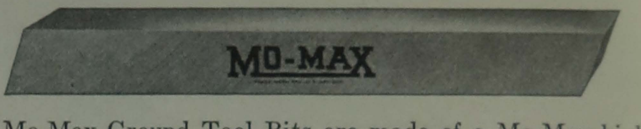


Size, Inches on Lines AA and BB	Each	Length Inches
⅛ x ½	$.45	4½
5/32 x ⅝	.50	5
3/16 x ¾	.85	6
¼ x ⅞	1.45	7
5/16 x 1	2.20	8
⅜ x 1¼	3.40	9
7/16 x 1⅜	4.60	10
½ x 1½	7.35	11
9/16 x 1⅝	9.50	15

NOTE.—Bevel and special shapes are rolled to approximate size, but require grinding on edges to bring to exact size.

Mo-Max Ground High Speed Steel Tool Bits

No. 850—Squares, Both Ends Beveled 20°



Mo-Max Ground Tool Bits are made of a Mo-Max high speed steel. The principal alloy of this steel contains molybdenum and a considerably lesser amount of tungsten. The other alloy ingredients are the usual quantities found in high speed steel, except that the carbon content is higher.

These bits have been accurately ground to size and are especially fitted for screw machine work. They are ready to be sharpened according to requirements. Suitable for cutting alloy steels, tool steels, stainless steels, cast iron, and general machine shop work.

Size In.	Each	Length Overall In.	No. Pcs. per Pkg.	Size In.	Each	Length Overall In.	No. Pcs. per Pkg.
3/16 Sq.	$.20	2½	12	⅝ Sq.	$1.35	4½	2
¼ Sq.	.26	2½	12	¾ Sq.	2.08	5	2
5/16 Sq.	.35	2½	12	⅞ Sq.	3.55	6	2
⅜ Sq.	.49	3	12	1 Sq.	5.65	7	1
7/16 Sq.	.66	3½	6	1⅛ Sq.	7.70	8	1
½ Sq.	.88	4	3	....	....	....	..

No. 851—Rectangular, Square Ends

Size In.	Each	Length Overall In.	No. Pcs. per Pkg.	Size In.	Each	Length Overall In.	No. Pcs. per Pkg.
¼x⅜	$.38	2½	12	⅜x¾	$1.18	4	6
¼x½	.53	3	12	⅜x¾	1.79	6	6
¼x½	.71	4	12	⅜x¾	4.15	14	2
¼x½	1.05	6	12	7/16x¾	1.86	6	4
¼x½	1.76	10	6	½x¾	1.26	4	4
5/16x½	.60	3	12	½x¾	1.90	6	4
⅜x½	.65	3	12	½x1	3.28	8	2
⅜x½	.85	4	12	⅝x¾	1.75	5	2
⅜x½	1.26	6	6	⅝x⅞	2.43	6	2
⅜x⅝	1.04	4	6	¾x1	3.20	6	1
⅜x⅝	1.30	5	6	⅞x1⅛	4.80	7	1
⅜x⅝	1.53	6	6	......	....	....	..

Armide Cutters

For Use in Armstrong Tool Holders

ARMIDE
ARMSTRONG
MADE IN U.S.A.

Armide is an improved carbide cutting metal, a new type, a carbide alloy. It approaches the diamond in hardness and machines chilled cast iron, hard and tough steels, bakelite, without appreciable loss of edge.

Because Armide is an alloy it takes a keener edge and a higher polish than previous carbides, and is tougher; has a tensile strength of 250,000 pounds per square inch, and hence is better able to withstand shock. Armide remains cool and securely brazed though its cutting edge runs red hot. Its edge remains smooth and clean for Armide will not alloy with steel or iron.

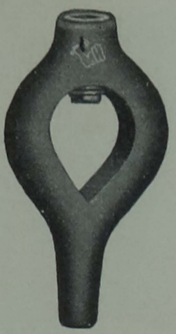
On certain jobs Armide Cutters have a tool life of from 10 to 200 times that of high speed steel. They are made in five styles: Form A, right hand turning and facing; Form B, left hand turning and facing; Form C, square nose; Form D, round nose; Form E, threading.

Square Body			Flat Body		
Size In.	Length In.	Each	Size In.	Length In.	Each
¼	1¾	$9.00	¼x⅜	1¾	$9.00
5/16	2¼	10.50	5/16x7/16	2¼	10.50
⅜	2½	11.50	⅜x½	2½	11.50
7/16	3	12.50	7/16x9/16	3	12.50
½	3½	14.50	½x¾	3½	14.50
⅝	4	18.50	⅝x⅞	4	18.50

Be sure to specify Form A, B, etc., square or flat, when ordering.

Armstrong Lathe Dogs

With Safety Headless Screws



Bent Tail **Straight Tail**

Forged from a special open hearth steel which is tough and at the same time possesses stiffness essential in lathe dogs.

No. Bent Tail	No. Straight Tail	Cap. In.	Wt. Lbs.	Price *Complete Each	No. Bent Tail	No. Straight Tail	Cap. In.	Wt. Lbs.	Price *Complete Each
1H	21H	3/8	1/4	$1.00	8H	28H	2	3 1/2	$2.80
2H	22H	1/2	3/8	1.10	9H	29H	2 1/2	5 1/4	3.60
3H	23H	3/4	1/2	1.20	10H	30H	3	6 3/4	4.60
4H	24H	1	3/4	1.40	11H	31H	3 1/2	9	6.00
5H	25H	1 1/4	1 1/2	1.70	12H	32H	4	12	9.00
6H	26H	1 1/2	2	2.00	13H	33H	5	18	16.00
7H	27H	1 3/4	2 3/4	2.40	14H	34H	6	24	24.00

Extra Screws

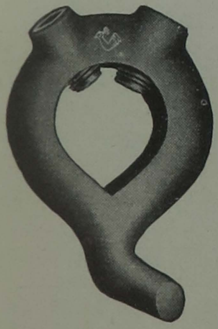
For Dog Nos.	Price Each	For Dog Nos.	Price Each	For Dog Nos.	Price Each
1H, 21H	$.20	4H, 24H	$.36	7H, 27H	$.60
2H, 22H	.24	5H, 25H	.42	....	...
3H, 23H	.30	6H, 26H	.50	....	...

Extra Wrenches

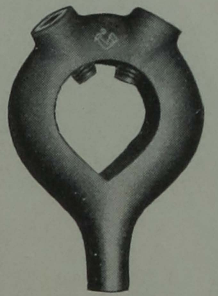
1H, 21H	$.12	4H, 24H	$.18	7H, 27H	$.26
2H, 22H	.14	5H, 25H	.20	....	...
3H, 23H	.16	6H, 26H	.24	....	...

*Price does not include wrench. If not specified a wrench for each size dog ordered will be shipped and charged for.

Armstrong Heavy Duty Lathe Dogs



With Safety Headless Screws



Bent Tail **Straight Tail**

No. Bent Tail	No. Straight Tail	Cap. Inches	Wt. Lbs.	*Price Complete Each	No. Bent Tail	No. Straight Tail	Cap. Inches	Wt. Lbs.	*Price Complete Each
...	128H	2	5	$5.50	113H	133H	5	21	$24.00
...	129H	2 1/2	6 3/4	7.00	114H	134H	6	29	34.00
...	130H	3	8 3/4	9.00	...	135H	7	37	46.00
...	131H	3 1/2	12 1/2	12.00	...	136H	8	50	56.00
112H	132H	4	15	16.00	...	...	.	..	.....

Extra Screws

For Dog Nos.	Price Each	For Dog Nos.	Price Each	For Dog Nos.	Price Each
128H	$.72	131H	$1.16	114H, 134H	$1.50
129H	.46	112H, 132H	1.16	135H	1.80
130H	.46	113H, 133H	1.50	136H	1.80

Extra Wrenches

128H	$.30	131	$.60	114H, 134H	$1.10
129H	.38	112H, 132H	.74	135H	1.30
130H	.48	113H, 133H	.90	136H	1.50

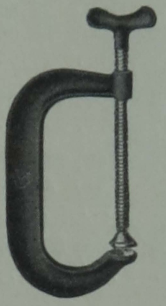
*Price does not include wrench.

When not otherwise specified, one wrench for each size dog ordered will be shipped and charged for.

Armstrong C Clamps

Designed with extra deep throat for maximum clearance required by body-builders, woodworkers and allied trades.

The body and wing type screw are drop forged from special steel and heat treated for strength and stiffness.



No.	Complete Each	Extra Screws Each	Cap. In. Max.	Cap. In. Min.	Depth In.	Diam. Screw In.	Wt. Lbs.
402	$1.50	$.60	2	0	2	1/2	1 1/8
403	1.80	.70	3	0	2 3/8	1/2	1 1/2
404	2.20	.80	4	0	2 3/4	5/8	2 1/4
406	3.00	1.00	6	0	3 5/8	5/8	3 3/4
408	4.00	1.20	8	2	4 1/2	3/4	5 1/2
410	5.00	1.50	10	3	5 3/8	3/4	8 1/4
412	6.50	2.00	12	4	5 3/4	7/8	12 1/2

Armstrong Drop-forged C Clamps

For Heavy Service

ARMSTRONG
CHICAGO

A heavy drop-forged clamp with long hub and extra large alloy steel screw.

In design, quality of material and accuracy of machining, these C clamps in every respect meet the demand for a strong, strictly high grade, reliable clamp.

No.	Complete Each	Extra Screws Each	Capacity Inches Max.	Capacity Inches Min.	Depth Center Screw to Back, In.	Wt. Lbs.	Diam. Screw Inches
9	$1.00	$.20	3/4	0	3/4	1/2	3/8
10	1.50	.24	1 1/4	0	1 1/8	3/4	7/16
11	2.50	.32	1 3/4	0	1 1/2	1 3/4	9/16
12	3.50	.48	2 1/4	7/8	1 7/8	3 1/2	11/16
13	5.00	.80	3 1/4	1 1/4	2 1/4	6	13/16
14	6.50	1.20	4 1/2	1 3/4	2 3/4	10	15/16
15	8.00	1.50	5 1/2	2 1/2	3 1/4	13 1/2	1
16	10.00	2.00	6 1/2	3 1/4	3 1/2	18 1/2	1 1/8
18	14.00	3.00	8 1/2	4 1/2	3 3/4	25	1 1/4
20	19.00	3.50	10 1/2	6	3 7/8	30	1 1/4
22	25.00	4.00	12 1/2	7 1/2	4	32	1 1/4

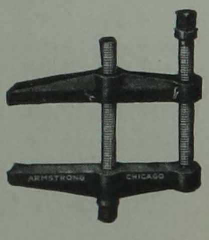
Heavy C clamps with full length screws can be furnished at special prices.

Armstrong Drop-forged Machinists' Clamps

These clamps are forged from a stiff, open hearth steel, carefully machined and hardened.

The under face of center screw is convex, fitting into a concave seat to allow for tilting. Jaws are extra heavy, will not bend or spring on a short bite and are faced true. Screws are hardened. Each clamp is boxed separately.

In ordering extra screws it is necessary to specify whether center or heel screw is wanted.



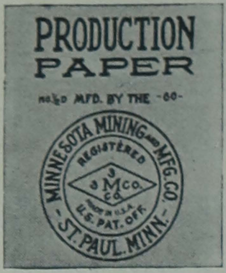
No.	Capacity Opens to Inches	Weight Pounds	Price, Each Complete	Price, Each Extra Screws
1	1 1/4	3/4	$3.00	$.20
2	2 1/4	1	4.00	.24
3	3 1/4	1 3/4	5.00	.30
4	4 1/4	2 3/4	6.00	.40

All Tools Shown in Our Catalogue are Fully Guaranteed

Production Paper Reams

In Sheets—9x11 Inches

In half ream packages, 240 sheets.

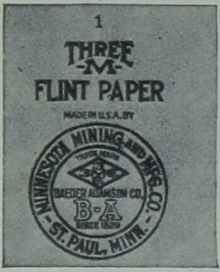

PRODUCTION
PAPER
MFD. BY THE
MINNESOTA MINING AND MFG. CO.
REGISTERED
3M Co.
U.S. PAT. OFF.
ST. PAUL, MINN.

Grade No.		Per Ream	Grade No.		Per Ream
A Weight—Finishing					
9/0	(320)	$22.50	4/0	(150)	$22.50
8/0	(280)	22.50	3/0	(120)	22.50
7/0	(240)	22.50	2/0	(100)	22.50
6/0	(220)	22.50	1/0	(80)	25.00
5/0	(180)	22.50	...	.....	.....
C Weight—Cabinet					
4/0	(150)	$22.50	2/0	(100)	$22.50
3/0	(120)	22.50	...	.....	.....
D Weight—Cabinet					
1/0	(80)	$25.00	1½	(40)	$37.50
½	(60)	29.00	2	(36)	42.00
1	(50)	33.00	...	.....	.....
E Weight—Roll Wt.					
2½	(30)	$46.50	3½	(20)	$56.30
3	(24)	51.20	...	....	.....

Three-M Brand Flint Paper

In Sheets—9x11 Inches

Half Ream Packages (240 Sheets)


1
THREE
-M-
FLINT PAPER
MADE IN U.S.A. BY
MINNESOTA MINING AND MFG. CO.
BAEDER ADAMSON CO.
B-A
ST. PAUL, MINN.

Grit No.	Per Ream	Reams in Bundle	Weight Pounds per Ream
4/0	$7.50	5	13½
3/0	7.50	5	14
2/0	7.50	5	16½
1/0	7.50	5	19
½	7.95	4	23
1	9.00	3½	28
1½	10.50	3	35
2	12.15	2	47
2½	13.95	2	54
3	15.90	1½	60
Assorted	10.50	3	34

Three-M Flint Paper Rolls

In 50-Yard Rolls

THREE
-M-
FLINT
PAPER
LOT 3
WIDTH 24
GRIT 2

	Price, per Roll							
	Grade Nos.							
Width In.	3/0 2/0	1/0	½	1	1½	2	2½	3
1	$1.15	$1.25	$1.40	$1.55	$1.75	$1.90	$2.10	$2.30
2	2.10	2.30	2.60	2.95	3.30	3.65	4.00	4.40
4	4.00	4.40	5.00	5.65	6.40	7.10	7.85	8.60
6	5.90	6.45	7.40	8.40	9.45	10.55	11.65	12.80
8	7.80	8.55	9.85	11.15	12.55	14.05	15.50	16.95
12	11.60	12.70	14.65	16.60	18.70	20.95	23.10	25.35
18	17.25	19.00	21.85	24.80	28.00	31.30	34.60	37.90
24	20.50	22.70	26.30	30.00	34.00	38.20	42.30	46.50

Intermediate sizes charged at next higher list price.

Three-M Garnet Cabinet Paper Reams

In Sheets—9x11 Inches

Half Ream Packages (240 Sheets)

Generally used by cabinet makers and wood workers, for hand sanding or surfacing of wood in the white. Also adaptable for sanding fibre, litholite, or other plastic materials.

1/0
2 2 M
THREE
-M-
GARNET CABINET
PAPER
MINNESOTA MINING AND MFG. CO.
BAEDER ADAMSON CO.
B-A
ST. PAUL, MINN.

Grade No.	Reams per Bundle	Wt. Lbs. per Ream	Price per Ream
4/0 (150)	5	21	$22.50
3/0 (120)	5	22	22.50
2/0 (100)	4	27	22.50
1/0 (80)	3½	35	25.00
½ (60)	3	43	29.00
1 (50)	2½	54	33.00
1½ (40)	2	65	37.50
2 (36)	1½	77	42.00
2½ (30)	1	103	46.50
3 (24)	1	110	51.20
3½ (20)	1	127	56.30

Three-M Garnet Paper Rolls

In 50-Yard Rolls

THREE
-M-
GARNET PAPER
MINNESOTA MINING
LOT 3
WIDTH 24
GRIT 2

Widths 24, 30, 36, 42 and 48 inches are originals. Other widths are slit from these.

Roll stock is made for use on drum, belt, spindle or disc machines in production plants. Heavy manila rope paper backing (130 pounds) is used in all grit numbers to give proper reinforcement to the cutting surface. It hugs spindle, drum or disc machines snugly and is free from wavy edges.

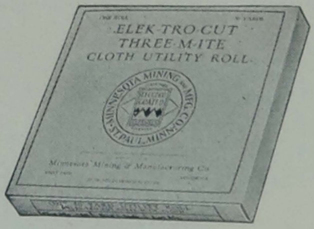
Prices for rolls other than 50 yards are proportionate to the 50-yard list plus a charge of 10 cents per inch of width.

	Price, per Roll									
	Grade Nos.									
Width In.	6/0 (220) 5/0 (180) 4/0 (150)	3/0 (120) 2/0 (100)	1/0 (80)	½ (60)	1 (50)	1½ (40)	2 (36)	2½ (30)	3 (24)	3½ (20)
4	$4.00	$4.00	$4.40	$5.00	$5.65	$6.40	$7.10	$7.85	$8.60	$9.40
6	5.90	5.90	6.45	7.40	8.40	9.45	10.55	11.65	12.80	14.00
8	7.80	7.80	8.55	9.85	11.15	12.55	14.05	15.50	16.95	18.60
10	9.70	9.70	10.65	12.25	13.85	15.65	17.50	19.30	21.15	23.20
12	11.60	11.60	12.70	14.65	16.60	18.70	20.95	23.10	25.35	27.80
15	14.40	14.40	15.85	18.25	20.70	23.35	26.15	28.85	31.65	34.75
18	17.25	17.25	19.00	21.85	24.80	28.00	31.30	34.60	37.90	41.65
20	19.15	19.15	21.10	24.30	27.55	31.10	34.80	38.40	42.10	46.25
24	20.50	20.50	22.70	26.30	30.00	34.00	38.20	42.30	46.50	51.20
30	.....	25.60	28.35	32.85	37.50	42.50	47.75	52.85	58.10	.....
36	.....	30.75	34.05	39.45	45.00	51.00	57.30	63.45	69.75	.....
42	.....	*35.85	39.70	46.00	52.50	59.50	66.85	74.00	81.40	.....
48	.....	*41.00	45.40	52.60	60.00	68.00	76.40	84.60	93.00	....

*Made in 2/0 (100) grade only.

Intermediate sizes charged at next higher list price.

Elek-Tro-Cut Three-M-Ite Cloth Utility Rolls


ELEK-TRO-CUT
THREE-M-ITE
CLOTH UTILITY ROLL
MINNESOTA MINING AND MFG. CO.
ST. PAUL, MINN.
Minnesota Mining & Manufacturing Co.

In 50-Yard Rolls

This roll is clean, the wooden spool being protected on the sides with heavy press board shields and tacked and glued to prevent loosening.

Will cut strips 50 yards long.

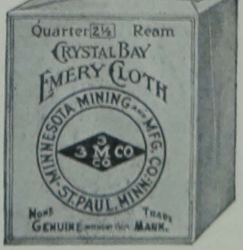
	Per Roll							
	Grade Nos.							
Width In.	*	80 1/0	60 ½	50 1	40 1½	36 2	30 2½	24 3
1	$2.90	$3.00	$3.25	$3.40	$3.60	$3.85	$4.05	$4.30
1½	4.05	4.20	4.50	4.80	5.10	5.45	5.75	6.10
2	5.15	5.40	5.80	6.15	6.55	7.00	7.45	7.95

*Grade Nos. 9/0 (320), 7/0 (240), 5/0 (180), 4/0 (150), 3/0 (120), 2/0 (100).

Crystal Bay Emery Cloth

In Sheets—9x11 Inches

Quire and Quarter Ream Packages


Quarter 2½ Ream
CRYSTAL BAY
EMERY CLOTH
MINNESOTA MINING AND MFG. CO.
3M Co.
ST. PAUL, MINN.
NONE GENUINE WITHOUT THIS TRADE MARK

Grit No.	Reams per Bundle	Weight Pounds per Ream	Price per Ream
3/0	2½	26	$30.00
2/0	2½	31	30.00
1/0	2½	36	30.00
½	2½	43	31.20
1	2	45	32.75
1½	2	50	34.30
2	2	56	36.50
2½	1½	68	39.40
3	1	80	42.50
Assorted	...	..	33.25

Assorted quarter ream packages, Grit Nos. 2/0 to 1½ inclusive, are put up in 1-quire lots.

Norton Alundum and Crystolon Abrasive Grain

60
Crystolon
NORTON

Alundum Abrasive Grain

Used extensively for polishing but is most highly efficient on steel and other materials of high tensile strength.

Style Package	Weight Pounds	Per Pound					
					Flour Sizes		
		Norton Sizing Sizes 4 to 240	G.M.S. Sizes 20 to 80	Std. Sizes 100 to 270	†F, 2F, 3F, 4F and XF	‡280, 320 400, 500	‡600
Carloads	36000Min.	$.09	$.09¾	$.10½	$.10½	....	....
Tons	2000	.10	.10¾	.11½	.11½	....	....
Kegs	*400	.10¾	.11½	.12¼	....	....	....
Kegs	*300	....	....	....	.12	....	....
Kegs	300	....	....	....	....	$.24	....
Kegs	230	....	....	....	....	....	$.40
Kegs	Over 200	....	....	....	....	....	....
Kegs	200	.11¼	.12	.12¾	.12½	.25	....
Kegs	100	.11¾	.12½	.13¼	.13	.26	.42
Kegs	50	.13	.13¾	.14½	.14½	.27½	.44
Cans	25	.14½	.15¼	.16	.16	.29	.46
		Each					
Cans	10	$1.80	$1.90	$1.95	$2.00	$3.10	$4.80
Cans	5	1.25	1.30	1.35	1.50	2.00	3.25
Cans	1	.40	.41	.42	.45	.50	.80

Crystolon Abrasive Grain

Its brittleness makes it highly efficient for polishing and grinding such metals as cast iron, chilled iron and brass, and such materials as glass, marble, granite and pearl, or all materials possessing low tensile strength.

Style Package	Weight Pounds	Per Pound			
			Flour Sizes		
		Grain Sizes 8 to 240	†F, 2F, 3F, 4F and XF	‡280, 320 400, 500	‡600
Kegs	* 325	$.16	....	....	....
Kegs	* 300	....	$.16	$.25	....
Kegs	230	....	....	....	$.45
Kegs	Over 200	....	....	....	....
Kegs	200	.16½	.16½	.26	....
Kegs	100	.17	.17	.27	.47
Kegs	50	.18	.18	.28	.48
Kegs	25	.20	.20	.30	.50
		Each			
Cans	10	$2.50	$2.50	$3.50	$5.50
Cans	5	1.75	1.75	2.50	4.00
Cans	1	.50	.50	.60	.90

38 Alundum (White) Abrasive Grain

Style Package	Weight Pounds	Per Pound			
			Flour Sizes		
		Grain Sizes 4 to 240	XF	280, 320, 400, 500	600
Kegs	*325	$.16	....	....	....
Kegs	300	....	....	$.24	....
Kegs	225	....	$.17	....	$.40
Kegs	200	.16½	.17½	.25	....
Kegs	150	....	.17½	....	....
Kegs	100	.17	.18	.26	.42
Kegs	50	.18	.18½	.27½	.44
Cans	25	.20	.20½	.29	.46
		Each			
Cans	10	$2.50	$2.75	$3.25	$5.00
Cans	5	1.75	1.90	2.25	3.50
Cans	1	.50	.55	.55	.90

*Approximate weight. †Unclassified. ‡Classified.

Clover Grinding and Lapping Compound

CLOVER
1lb.
1A
GRINDING & LAP
COMPOUND
4oz
COARSE
E
A
2oz
COARSE
FINE

The 2 and 4-ounce duplex, 2-compartment cans, contain 2 grades, E, coarse for roughing and A, fine, for finishing. The 4-ounce can is fitted with a quick-grip cover, and the 2-ounce can with a compression tight cover. These cans are intended to be carried in the kit.

Single-grade cans are furnished in 8 grades as follows:

2-A. Microscopic fine, for fine lapping, polishing and fitting of parts.

1-A. Very fine, for fine lapping, surfacing, fitting of parts, lapping dies, gauges, fine polishing, etc.

A. Fine, for finishing valve grinding, lapping cylinders, lapping rings into cylinders, grinding crank shafts into bearings, running-together gearing, etc.

B. Medium fine, a finishing grade, or on fine work used for roughing.

C. Medium, for cylinder lapping, light power grinding, etc.

D. Medium coarse, for medium-heavy roughing and grinding.

E. Coarse, for use on large surfaces, for roughing valves and for quick work.

50. Special, exceedingly coarse for extra heavy work.

	Duplex Cans		Single-Grade Cans			
Size Can......	2-Oz.	4-Oz	¼-Lb.	½-Lb.	1-Lb.	5-Lb.
Each..........	$.30	.50	.50	.85	1.50	6.00

Three-M Water Mix Lapping and Valve Grinding Compound

3-M
1 lb.
WATER MIX
MEDIUM
LAPPING & VALVE GRINDING COMPOUND
3-M
LAPPING AND GRINDING COMPOUND
WATER MIX 1 lb. MEDIUM

Made of silicon carbide.

This compound is made in 3 grades: Fine, medium and coarse.

Fine grade is for fine grinding.

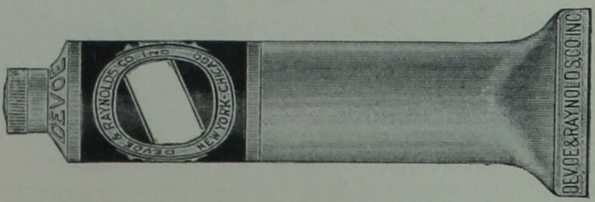
Medium grade is for all ordinary jobs. It will produce a tight joint between seat and valve with no finishing required after grinding.

Coarse grade is recommended for grinding Stellite and chrome steel and other metals too hard for ordinary compounds.

The 2 and 4-ounce cans are packed 12 cans to a carton, medium grade only; 8-ounce cans, 12 to a carton, any one grade; 1-pound cans, 6 to a carton, any one grade.

Size Can........................	2-Oz.	4-Oz.	8-Oz.	1-Lb.
Per Can........................	$.25	.40	.75	1.30

Prussian Blue


DEVOE
DEVOE & RAYNOLDS CO. INC. NEW YORK·CHICAGO
DEVOE&RAYNOLDSCO.INC.

For locating high spots or worn parts on metal surfaces. Used extensively in fitting shaft bearings, seating valves, etc.

Made from the highest quality of material and contains no grit or other foreign substance.

Single tube is ½x4 inches; double tubes, ¾x4 inches.

Single Tubes....................................each	$.15
Double Tubes....................................each	.24

American Steel Wool

GRADE NO. 0
AMERICAN
STEEL WOOL
ONE POUND NET
AMERICAN STEEL WOOL MFG. CO., INC.
NEW YORK, U.S.A.

Grades No. 000 and 00 are for rubbing down final coats, dulling varnish and antique finishing.

Grade No. 0 is for cleaning aluminum utensils, finishing and reviving old painted surfaces.

Grades No. 1 and 2 are for intermediate use, surfacing, cleaning linoleum floors and general abrasive uses.

Grade No. 3 is for removing painted surfaces, rough cleaning and surfacing and removing rust.

Packed 25 one-pound rolls in a case.

Grade No.	000	00	0	1	2	3
Per Pound	**$.44**	**.31**	**.23**	**.23**	**.22**	**.22**

Annite Industrial Cleaning Materials

Annite Cleaning Materials are designed for efficient removal of dirt, for general cleaning, and for a wide range of industrial production or process cleaning operations.

Annite Red Label

A highly effective colloidal detergent for general cleaning purposes—hands, walls, floors, painted surfaces, windows—in office buildings, apartment houses, hotels, and institutions. Also used in bakeries, meat packing plants, railroad shops, power plants, etc. Superior for washing paper mill felts, produces a "lofty" condition and increases life of the felts. Many laundries use Annite because it produces a whiter, cleaner "bundle" more economically.

This material combines great cleansing effectiveness with soft and gentle action. It is completely soluble and functions effectively in any water.

Quickly and thoroughly emulsifies and liberates the grease or oil which is the base of practically all kinds of dirt. The emulsion thus formed remains in suspension, readily mixes with water and rinses away freely. Annite removes stubborn stains and practically all kinds of dirt from washable fabrics and surfaces.

Annite is an effective deodorant and leaves no taste or odor to contaminate foodstuffs.

In 5, 25, 50 and 100-pound bags and in 250-pound barrels; also in 5-pound canisters (by case of 6) and 8-ounce packages (by case of 24).

Annite Brown Label

A special detergent for use in mechanically and manually operated dish-washing machines. It forms no suds—has excellent emulsifying properties, rinses freely, imparts unusual brilliance to glassware and dishes and has many other points of merit.

Shipped in 100 and 250-pound drums.

Annite White Label—Nos. 1 and 2

A series of foolproof materials for tank cleaning of aluminum, aluminum alloys and tin. Will not tarnish aluminum or spangle tin regardless of concentration or temperature of the solution, or time of immersion.

Shipped in 100 and 325-pound drums.

Annite Yellow Label—Nos. 1 and 4

A series of special cleaners for production cleaning of nonferrous metals—copper, brass, bronze, lead, zinc, nickel, etc. Produce a chemically clean surface in a minimum of time, without hazard of tarnish or spotting of the metals.

In 100 and 325-pound drums.

Annite Black Label—Nos. 1, 2, 4, 6, and 8

A series of heavy duty cleaners for iron, steel and ferrous alloys, and for removing heavy grease deposits, paint stripping, etc. For removing specific kinds of oils and dirt encountered in various cleaning operations—some especially for vegetable oils, others for mineral oils.

In 100 and 325-pound drums.

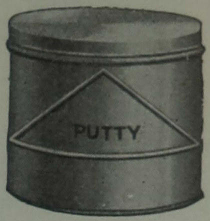
Annite Technical Service

In order to assist users in the proper Annite Materials for any cleaning problem, specific recommendations will be made based on detailed information.

Prices and further information upon application.

Compounds and Cleansing Materials

Commercial Putty



In 5½, 12½ and 25-pound cans.
Prices upon application.

Lump Chalk

In white only. In bulk and 400-pound barrels.
Price.............................per 100 pounds .....

Caustic Soda

All strength, powdered or solid.
Prices upon application.

Soda Ash

In barrels of 350 pounds, or in bulk.
Prices upon application.

Paraffine Wax

In one pound sticks of convenient shape.
Prices upon application.

Beeswax

In one pound cakes.
Prices upon application.

Rosin

Furnished in 1 pound package.
Prices upon application.

Sulphur

In lump and powdered form. In bulk and in barrels.
Prices upon application.

Coloring Compound

Made especially for high coloring on copper, brass and nickel. Hard and dry and leaves the work perfectly clear. It is unequalled for spotting oxidized copper.

Prices upon application.

Pumice Stone

Powdered and lump.
Prices upon application.

Rotten Stone

Bulk, lump and paste.
Prices upon application.

Crocus Composition

In cakes of about 3 pounds each and in bulk.
Prices upon application.

Tripoli Composition

In brick form of about 2½ pounds and powdered.
Prices upon application.

Ground Flint or Powdered Glass

In Nos. 00, 0, ½, 1, 1½, 2, 2½, 3, 3½ and 4 grains.
Prices upon application.

Emery Cake

In bricks of about 2½ pounds and in barrels.
Prices upon application.

Norton India Combination Stones

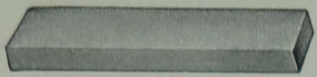
NORTON ABRASIVES
INDIA
NORTON ABRASIVES
INDIA

A coarse and fine stone vitrified together. The coarse side grinds down dull tools and the fine side puts on a finished edge. Useful for planer and paper-cutting knives.

Also made round in shape for rotary strokes.

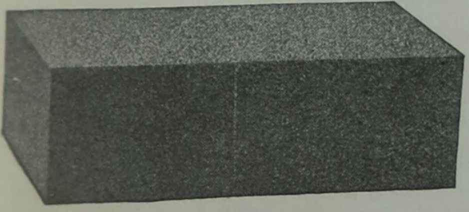
No.	IB8	IB7	IB6	IB45	IB134	IB64
Each	**$1.75**	**1.50**	**1.25**	**1.00**	**.85**	**1.25**
Size.....in.	8x2x1	7x2x1	6x2x1	5x2x¾	4x1¾x⅝	4x1 Round
Std. Pkg.	6	6	6	6	6	6
Wt.....lbs.	10	8½	7¼	3½	2½	8

Yates-American Jointer Stones

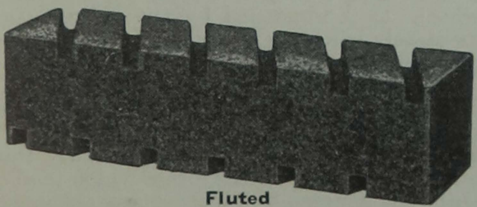


Size, Inches	Each	Per Dozen
3/16x7/8x4	$.30	$3.00
1/4x25/32x2 3/8	.35	3.60
1/4x25/32x2 1/2 Single or Double Bevel	.35	4.20
1/4x3/4x4	.30	3.00
1/4x7/8x4	.30	3.00
1/4 Diameter Round x 4 Long	1.25	15.00
3/8x1 1/4x3 1/2	.50	5.40
3/8x1 1/4x3 5/8 Double Bevel (Indiana Stone)	.60	7.20
3/8x1 1/4x3 5/8 Double Bevel	.40	4.80
1/2x 3/4x1 3/4	.25	2.40
1/2x1 x3	.30	3.00
1/2x1 1/2x4	.45	4.80
1/2x1 3/4x4	.50	5.40
3/4x 3/4x2 3/4	.30	3.00
3/4x 3/4x4	.35	3.60
3/4x1 x3 1/2	.45	4.80
3/4x1 x4	.50	5.40
3/4x1 1/2x3 1/2	.60	6.50
3/4x2 x3 1/2	.70	7.80
3/4x2 1/2x3 1/2	.75	8.10
3/4x2 1/2x4	.80	8.40
3/4x2 1/2x6	.95	10.20
3/4x3 x3 1/2	.85	9.00
3/4x3 1/2x3 1/2	.90	9.60
3/4x3 1/2x4	.90	9.60
3/4x3 1/2x6	1.40	14.80
3/4x3 1/2x6 1/2	1.45	15.40
3/4x5 x3 1/2	1.35	14.60
3/4x8 x4	1.85	20.00
3/4 Diameter Round x 4 Long	.50	5.40

Rubbing Bricks



Plain



Fluted

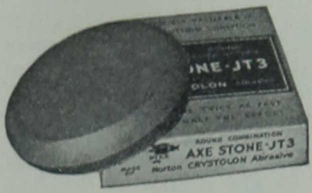
Made of either Aluminox or Carbolite in a variety of sizes, shapes and grains.

Used for scouring castings, general foundry work, dressing and smoothing marble and granite, scouring chilled iron rolls and similar work. Bricks can often be used for truing up or dressing grinding wheels. Special perforated bricks supplied for rubbing down castings; also for rubbing down varnish on patent leather and bricks with fluted sides supplied for rubbing down concrete and similar work.

Table shows the standard sizes of plain and fluted bricks; special sizes can be supplied.

Size Inches	Each	Size Inches	Each
4x2x1	$.55	8x3x2	$1.90
4x2x2	.85	8x3x3	2.80
4x3x2	1.10	8x4x2	2.50
6x2x1/2	.65	8x4x4	4.90
6x2x1	.70	Fluted	....
6x2x2	1.10	4x2x2	.85
6x3x2	1.50	6x2x2	1.10
6x3x3	2.15	8x2x2	1.40
8x2x1	.85	8x3x3	2.80
8x2x2	1.40	.....	....

No. JT3 Norton Crystolon Axe Stones



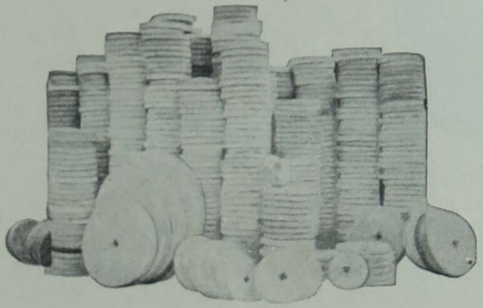
Size, 3x5/8 inches.

Packed 1 in a box.

Weight per dozen, 4 1/2 lbs.

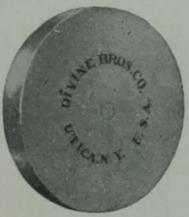
No. JT3............each **$.60**

Unmounted Grindstones



Grindstones in any quantities and of suitable grits for every variety of grinding can be furnished. All loose stones are made with parallel sides, will pile flat and firm and are not liable to breakage when stacked or stored.

Solid Spanish Felt Polishing Wheels

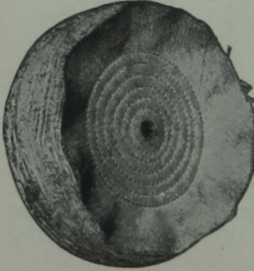


Weights given are only average and will vary according to density of wheels.

Diam. In.	Per Lb.	Face In.	Weight Lbs.	Weight Oz.	Diam. In.	Per Lb.	Face In.	Weight Lbs.	Weight Oz.
4	...	1	...	..	14	...	2	7	..
6	...	1	3/4	..	14	...	3	10	..
8	...	1	1 1/4	..	16	...	1	5	8
10	...	1	2 1/4	..	16	...	2	9	..
10	...	2	4	..	18	...	1	6	8
12	...	1	3	..	18	...	2	11	..
12	...	2	5	2	20	...	2	17	..
14	...	1	3	12	..	...	..	..	..

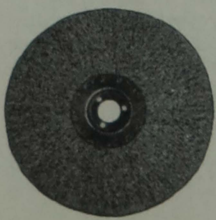
Loose Cotton Flannel Buffs

10-ply



Diam. In.	Size Hole In.	Price per Section
6	1/2	....
8	1/2, 3/4	....
10	1, 1 1/4	....
12	3/4, 1, 1 1/4	....
14	1, 1 1/4	....
16	1, 1 1/4	....
18	1, 1 1/4	....
20	1, 1 1/4	....

No. 834 U.S. Wire Revolving Brushes



Round wire; 1/2-inch sections have individual hubs. Specify size hole and number of sections wanted.

Size....in.	3	4	5	6	7
Per Section....	$.50	.65	.75	1.00	1.10

Size......in.	8	10	12
Per Section.	$1.20	1.35	1.60

Abrasives Used in American Products

The following kinds of different abrasives have been selected as best for their respective fields—all products of the electric furnace.

Aluminox. — An oxide of aluminum abrasive, and a product of the electric furnace, is best suited for work on materials of high tensile strength. Starting with high quality of bauxite clays, Aluminox is processed by thoroughly modern methods, subject to constant inspection. It offers a high combination of hardness and toughness. Unexcelled for the great bulk of grinding operations on steels and alloys.

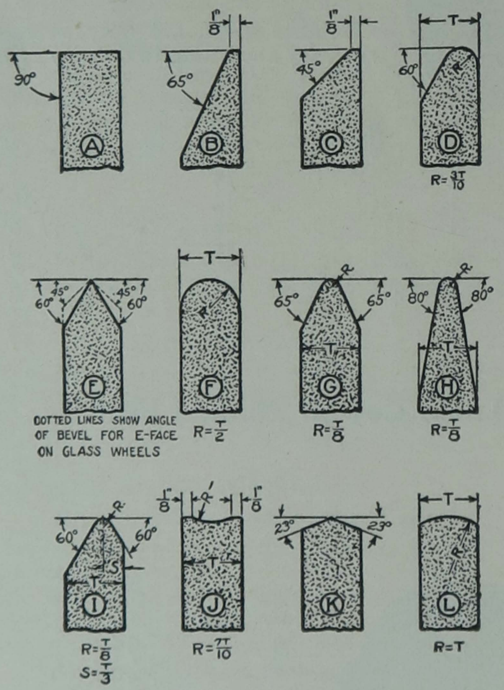
29 Aluminox.—An oxide of aluminum abrasive, more friable than Aluminox but does not possess the high crystallized characteristics of 77 Aluminox. Recommended for precision grinding of soft and mild tempered steels.

77 Aluminox.—An abrasive of special preparation and purification. It analyzes 98 to 99 per cent alumina. Its special field is precision work on hardened steel where a comparatively brittle abrasive is an essential. 77 Aluminox vitrified wheels have characteristic red and white colors.

Carbolite.—A silicon carbide abrasive, best suited for grinding materials of low tensile strength such as cast iron, brass, bronze, as well as all non-metallic substances. Carbolite is of extreme hardness, and the grains are brittle enough to allow them to fracture as they become dulled.

American Grinding Wheels

Shapes of Wheel Faces



Special shapes of cutting edges are frequently required, and will be furnished upon receipt of diagram showing what is wanted. Illustration shows those most commonly used for grinding moulding cutters and for saw gumming. These should be ordered by the letters given upon diagrams. Any desired shape will be furnished.

Wheels furnished with square faces when no shape is specified.

When ordering give diameter and thickness of wheel, size of arbor hole, quantity wanted, description of work to be ground and speed proposed to run wheels. If other than straight or flat face on wheel is wanted send sketch of what is required. If cup wheels are wanted give in addition to above information—thickness of rim, thickness of back and name of grinding machine. If recessed wheels are required give diameter and depth of recess on one or both sides and the name of grinding machine.

American Grinding Wheels

Processes of Manufacture

The great variety of grinding operations and conditions make it necessary that grinding wheels be made in many different ways so that the utmost in efficiency and safety may be assured to the user.

American grinding wheels are produced to meet the particular requirements of each customer and it is determined, after careful analysis of the grinding job, which of the following methods of manufacture or kind of bond will give the best results.

Vitrified Process.—Vitrified process wheels are those made in kilns at a high temperature with mineral and clay mixtures as the bonding agents.

Silicate Process.—This process, as the name implies, calls for silicate of soda as the principal bond. Low temperature ovens are used.

Elastic Process.—This means that wheels made this way have a certain amount of elasticity. They also have great strength, being bonded with flaked shellac.

Bakelite Bond.—A process which calls for the application of heat and pressure to a mixture of grain and a synthetic phenolic resin.

The method of making cylinder wheels of the Blanchard type which assures uniformity and duplication of grade is a process developed and used by The American Emery Wheel Works only.

Grain and Grade

By "grain" is meant the size of the cutting particles of abrasive used in the manufacture of grinding wheels. The size of grain is determined by the number of meshes per linear inch in the screen on which the grain is retained. For example, a No. 30 grain is one which will be just held on a screen having 30 meshes to the linear inch but will pass through its control screen of the next coarser size.

For certain grinding operations, particularly cylindrical grinding, 3 or more grain sizes are mixed together to secure a desired cutting action. Such a wheel is called a combination wheel. It is identified by the abbreviation "Comb." immediately following the grain size. Example—grain 30 Comb. grade K.

The term "grade" designates the hardness of a grinding wheel. It must not be confused with the hardness of the abrasive itself for it represents wholly the strength of the bond or resistance to the forces which tend to break it down. Different degrees of hardness are obtained by varying the proportions and kinds of bonds and methods of manufacture.

As a machinist works to certain plus and minus tolerances so does a wheel maker work to certain limits. A grade is a wheel maker's measure as to hardness. Grinding wheels are segregated into various classes or ranges having standard fixed limits. Any wheel within a certain range is given the grade marking for that particular class.

While the burning of wheels has reached a high state of perfection, still, as is generally recognized in all industries where high firing temperatures are employed, variations exist. To control heat treatment a standardized hourly firing schedule is maintained; equipping the ovens with heat recorders and kilns with electric pyrometers and pyrometric cones.

American Grinding Wheels

Operating Speeds for Grinding Wheels

For ordinary grinding purposes an operating speed of from 5000 to 6000 surface feet per minute is recommended for vitrified or silicate process wheels. The speed will vary according to the operation or grade of hardness of the wheel. Extremely soft grade wheels should be operated at a lower running speed than the standard recommendation for that diameter.

While the usual safety limit of speed on vitrified or silicate wheels is 6500 surface feet, wheels are furnished in either elastic or bakelite bond which will easily stand a running speed up to 9000 surface feet per minute.

The recommended running speed or r.p.m. for each grinding wheel is shown on the tag attached to it.

Revolutions per Minute for Various Sizes of Grinding Wheels to give Peripheral Speed in Feet per Minute

Diameter Wheel Inches.	Speed, R.P.M. 4000 Ft.	4500 Ft.	5000 Ft.	5500 Ft.	6000 Ft.	6500 Ft.
1	15279	17200	19099	21000	22918	24850
2	7639	8590	9549	10500	11459	12420
3	5093	5725	6366	7000	7639	8270
4	3820	4295	4775	5250	5730	6205
5	3056	3440	3820	4200	4584	4970
6	2546	2865	3183	3500	3820	4140
7	2183	2455	2728	3000	3274	3550
8	1910	2150	2387	2635	2865	3100
10	1528	1720	1910	2100	2292	2485
12	1273	1433	1592	1750	1910	2070
14	1091	1228	1364	1500	1637	1773
16	955	1075	1194	1314	1432	1552
18	849	957	1061	1167	1273	1380
20	764	860	955	1050	1146	1241
22	694	782	868	952	1042	1128
24	637	716	796	876	955	1035
26	586	661	733	809	879	955
28	546	614	683	749	819	887
30	509	573	637	700	764	827
32	477	537	596	657	716	776
34	449	506	561	618	674	730
36	424	477	531	584	637	689

Standard Grain Sizes

Very Coarse	Coarse	Medium	Fine	Very Fine	Flour Sizes
8	14	36	70	150	280
10	16	46	80	180	320
12	20	54	90	200	400
..	24	60	100	220	500
..	30	..	120	240	600

Grade List

Grade	Vitrified Process	Silicate Process	Elastic Process	Bakelite Process
Very Soft	G	½	½E	......
	H	¾	¾E	.....
	I	1	1 E	.....
Soft	J	1½	1½E	.....
	K	2	2 E	.....
	L	2½	2½E	.....
Medium	M	3	3 E	3 B
	N	3½	3½E	3½B
	O	4	4 E	4 B
Medium Hard	P	4½	4½E	4½B
	Q	5	5 E	5 B
	R	6	6 E	6 B
Very Hard	S	7	7 E	7 B
	T	...	....	8 B
	U	...	....	9 B
Extra Hard	V	...	....	10 B
	W	...	....	11 B
	X	...	....	......
	Y	...	....	......
	Z	...	....	......

American Grinding Wheels

Grain and Grade Selections

A long experience has shown that wheels in the grains and grades in the first selection column will usually give the best results if used under standard conditions. Sometimes, however, an operation will require a little coarser or finer, softer or harder wheel. For this reason the ranges of grain sizes and grades for various operations are shown.

Explanation of Symbols

Alum.	Aluminox Abrasive
Carb.	Carbolite Abrasive
Vit.	Vitrified Bond
Sil.	Silicate Bond
Elas.	Elastic Bond
77 (Before Grain Size)	77 Aluminox Abrasive
29 (Before Grain Size)	29 Aluminox Abrasive
Comb. (After Grain Size)	A Combination of Grain Sizes.

Method of Grinding	Abrasive Material and Process	First Selection Grain	First Selection Grade	Sometimes As Coarse As	Sometimes As Fine As	Sometimes As Soft As	Sometimes As Hard As
Automobile Cylinders							
Internal	Carb. Vit.	36	J	30	36	I	K
Bits—Woodworking							
Hand	Alum. Vit.	50	N	50	60	M	N
Brass Castings—Large							
Hand	Carb. Vit.	20	R	16	24	Q+	R+
Brass Castings—Small							
Hand	Carb. Vit.	24	Q	20	30	P+	Q+
Bronze—Hard							
Snagging	Carb. Vit.	24	Q	20	36	Q	R
Bronze—Soft							
Use same wheels as for brass.							
Cast Iron							
Surfacing	Carb. Vit.	20	H	14	24	H	J
Small Castings	Carb. Vit.	241	R+	201	241	R	S
Chilled Iron							
Snagging	Carb. Vit.	241	S	201	241	R+	T
Chisels							
Sharpening	Alum. Vit.	46	N	46	60	M	O
Cylinders—Gas Engine							
Internal, Regrinding	Carb. Vit.	36	I	...	...	I	J
Dies—Drawing							
Cleaning	Alum. Vit.	46	M	...	60	L	N
Surfacing, Straight Wheels	Alum. Vit.	7746	K	36	60	J	L
Drills							
Sharpening	Alum. Vit.	36	L	36	46	L	M
Drills—Small							
Sharpening, by Hand	Alum. Vit.	60	N	46	60	N	O
Drills—Large							
Sharpening, by Hand	Alum. Vit.	36	P	30	46	P	Q
Forgings							
Snagging	Alum. Vit.	20	R	16	24	R	S
Gears—Cast Iron							
Cleaning Between Teeth, by Hand	Carb. Elas.	361	5½E	301	361	5½E	6½E
Knives—Moulding							
Sharpening, by Hand	Alum. Vit.	46	M	36	46	M	O
Machine Shop							
General, by Hand	Alum. Vit.	36	P	24	46	O	Q
Malleable Iron—Annealed							
Snagging	Alum. Vit.	20	S	20	24	R	T
Malleable Iron—Unannealed							
Snagging	Carb. Vit.	161	S+	16	24	S	U

American Grinding Wheels

Grain and Grade Selections

Continued

		First Selection		Sometimes		Sometimes	
Method of Grinding	Abrasive Material and Process	Grain	Grade	As Coarse As	As Fine As	As Soft As	As Hard As
Pistons—Aluminum							
Cylindrical......	Carb. Vit.	36	L	36	46	K	M
Pistons—Cast Iron							
Cylindrical......	Carb. Vit.	36	L	..	46	L	M
Reamers							
Backing Off.....	Alum. Vit.	46	K+	46	60	K	M
Saws—Band							
Gumming.......	Alum. Vit.	50	M	36	60	M	O
Saws—Circular							
Gumming.......	Alum. Vit.	50	M	36	60	M	O
Saws—Metal Cutting							
Gumming.......	Alum. Vit.	60	P	46	60	P	R
Steel Castings—Low Carbon							
Snagging, Swing Frame.......	Alum. Vit.	12	T	10	16	S	W
Snagging Swing Frame......	H. S. Alum. Vit.	14	5½B	10	20	4½B	10B
Snagging, Floor Stand........	Alum. Vit.	14	R	12	16	R	S
Snagging, Portable Machine.	Alum. Vit.	20	R	16	24	R	S
Steel Castings—Manganese							
Snagging, Swing Frame.......	Alum. Vit.	12	R	12	16	R	T
Snagging, Floor Stand........	Alum. Vit.	16	Q	14	20	Q	S
Steel—Hardened							
Cylindrical......	Alum. Vit.	Comb. 24	L	..	..	L	M
Steel—Soft							
Cylindrical......	Alum. Vit.	Comb. 24	N	..	..	M	O
Surfacing, Straight Wheels.......	Alum. Vit.	2936	K	2936	2946	K	M
Steel—High Speed							
Surfacing, Straight Wheels.......	Alum. Vit.	7746	H	7736	7746	G	J
Internal........	Alum. Vit.	7746	L	7746	7760	J	M
Stove Parts—Cast Iron							
Snagging.......	Carb. Vit.	201	T	201	241	S	U
Fitting and Mountings....	Carb. Vit.	241	T	241	301	S	U
Taps							
Grinding Relief..	Alum. Vit.	46	O	46	60	M	P
Tools—Lathe and Planer							
Light, by Hand..	Alum. Vit.	60	N	46	60	O	O
Heavy, by Hand.	Alum. Vit.	30	P	24	36	O	Q
Valves—Automobile							
Grinding Seats..	Alum. Vit.	60	M	46	80	L	O
Welds							
Cleaning.......	Alum. Vit.	24	R	24	36	R	S
Wrenches							
Snagging.......	Alum. Vit.	24	R	20	24	R	S
Wrought Iron							
Snagging.......	Alum. Vit.	20	R	16	24	R	S

Suggestions if Wheel is Not Entirely Satisfactory

If wheel too soft: Use one or two grades harder; increase wheel speed inside safety limit; remember soft wheels wear away quicker but produce more work in a given time.

If wheel too hard: Use one or two grades softer; decrease wheel speed; remember hard wheels last longer but do not produce as much work in a given time.

If wheel too coarse: Use one or two grain sizes finer; increase wheel or work speed or both.

If wheel too fine: Use one or two grain sizes coarser; decrease wheel or work speed or both.

Standard Straight Grinding Wheels

Vitrified and Silicate Bonds

Price Each

Diam. In.	Thickness of Wheels, Inches							
	⅛	¼	⅜	½	⅝	¾	⅞	1
1	$.45	$.45	$.50	$.50	$.55	$.55	$.60	$.60
1½	.50	.50	.55	.55	.60	.60	.65	.70
2	.60	.60	.65	.70	.75	.75	.80	.85
2½	.75	.75	.80	.85	.90	.95	1.00	1.05
3	.90	.90	.95	1.05	1.10	1.20	1.25	1.30
3½	1.70	1.40	1.50	1.60	1.70	1.80	1.90	2.00
4	1.85	1.55	1.65	1.75	1.90	2.05	2.20	2.35
4½	2.15	1.75	1.90	2.05	2.20	2.40	2.60	2.80
5	2.40	2.10	2.30	2.50	2.70	2.90	3.10	3.30
6	2.85	2.50	2.75	3.00	3.25	3.50	3.75	4.00
7	3.60	2.90	3.25	3.60	3.95	4.30	4.60	4.90
8	4.40	3.45	3.90	4.30	4.70	5.15	5.55	6.00
9	....	4.05	4.60	5.15	5.65	6.15	6.65	7.15
10	....	4.75	5.40	6.05	6.65	7.25	7.85	8.45
12	....	6.30	7.20	8.10	8.95	9.80	10.65	11.50
14	....	....	....	10.20	11.50	12.80	14.10	15.40
16	....	....	....	.....	.....	16.60	18.30	20.00
18	....	....	....	.....	.....	.....	.....	25.20

Diam. In.	Thickness of Wheels, Inches					
	1¼	1½	1¾	2	2¼	2½
1	$.80	$1.00	$1.20	$1.35	$1.55	$1.75
1½	.90	1.10	1.30	1.55	1.75	1.95
2	1.10	1.30	1.55	1.80	2.00	2.25
2½	1.30	1.60	1.85	2.10	2.35	2.65
3	1.60	1.90	2.20	2.50	2.80	3.10
3½	2.30	2.65	2.95	3.25	3.55	3.90
4	2.70	3.10	3.45	3.80	4.15	4.55
4½	3.20	3.65	4.05	4.45	4.90	5.30
5	3.80	4.25	4.75	5.20	5.70	6.15
6	4.60	5.25	5.90	6.55	7.20	7.85
7	5.70	6.55	7.40	8.25	9.05	9.90
8	7.00	8.00	9.10	10.15	11.20	12.30
9	8.40	9.75	11.05	12.35	13.65	15.00
10	10.05	11.65	13.20	14.80	16.40	18.00
12	13.75	15.95	18.20	20.45	22.65	24.90
14	18.40	21.35	24.30	27.25	30.20	33.15
16	23.80	27.60	31.40	35.20	38.95	42.75
18	29.90	34.65	39.40	44.10	48.85	53.55
20	36.75	42.55	48.35	54.15	59.90	65.70
22	44.25	51.35	58.45	65.55	72.65	79.75
24	52.55	61.00	69.55	78.10	86.60	95.15
26	64.30	72.25	82.35	92.45	102.55	112.65
28	77.00	84.40	96.15	107.95	119.70	131.50
30	90.65	97.45	111.05	124.60	138.20	151.75
32	106.50	111.40	126.90	142.40	157.90	173.40
34	122.45	126.25	143.80	161.35	178.90	196.50
36	139.85	145.00	164.60	184.25	203.85	223.50

Diam. In.	Thickness of Wheels, Inches					
	2¾	3	3¼	3½	3¾	4
1	$1.95	$2.15	$2.35	$2.50	$2.70	$2.90
1½	2.15	2.35	2.55	2.80	3.00	3.20
2	2.50	2.70	2.95	3.20	3.40	3.65
2½	2.90	3.15	3.40	3.70	3.95	4.20
3	3.40	3.70	4.00	4.30	4.60	4.90
3½	4.20	4.50	4.80	5.15	5.45	5.75
4	4.90	5.25	5.60	6.00	6.35	6.70
4½	5.70	6.15	6.55	6.95	7.40	7.80
5	6.65	7.10	7.60	8.05	8.55	9.00
6	8.50	9.20	9.85	10.50	11.15	11.80
7	10.75	11.60	12.45	13.30	14.15	15.00
8	13.35	14.40	15.50	16.55	17.60	18.65
9	16.30	17.60	18.90	20.25	21.55	22.85
10	19.60	21.15	22.75	24.35	25.95	27.50
12	27.15	29.35	31.60	33.80	36.05	38.30
14	36.10	39.05	42.05	45.00	47.95	50.90
16	46.55	50.30	54.10	57.90	61.70	65.45
18	58.30	63.05	67.75	72.50	77.25	81.95
20	71.50	77.25	83.05	88.85	94.65	100.40
22	86.85	93.95	101.05	108.15	115.25	122.35
24	103.70	112.25	120.75	129.30	137.85	146.40
26	122.70	132.80	142.90	153.00	163.10	173.20
28	143.25	155.05	166.80	178.60	190.35	202.15
30	165.35	178.90	192.50	206.05	219.65	233.20
32	188.95	204.45	219.95	235.45	250.95	266.45
34	214.05	231.60	249.15	266.70	284.25	301.85
36	243.10	262.70	282.35	301.95	321.55	341.20

Standard Straight Grinding Wheels

Resinoid Bonded

Price Each

Diameter Inches	Thickness of Wheel, Inches 3/32	1/8	1/4	3/8	1/2	5/8	3/4
1	$.55	$.60	$.65	$.70	$.75	$.80	$.85
1½	.60	.65	.70	.80	.85	.90	.95
2	.65	.70	.75	.90	.95	1.00	1.05
2½	.70	.80	.85	1.00	1.05	1.10	1.15
3	.80	.90	1.00	1.15	1.20	1.25	1.35
3½	.90	1.00	1.15	1.30	1.40	1.50	1.65
4	1.00	1.10	1.30	1.45	1.60	1.75	1.95
4½	1.10	1.20	1.45	1.70	1.85	2.05	2.25
5	1.20	1.30	1.60	1.95	2.15	2.35	2.55
6	1.30	1.45	1.80	2.30	2.55	2.80	3.05
7	1.50	1.65	2.10	2.70	3.00	3.30	3.60
8	1.70	1.90	2.45	3.15	3.60	4.05	4.50
9	2.00	2.25	2.85	3.65	4.25	4.80	5.40
10	2.45	2.70	3.45	4.45	5.20	5.95	6.70
12	3.35	3.70	4.90	5.90	6.90	7.90	8.90
14	4.45	4.95	6.45	7.55	8.70	9.90	11.40
16	....	6.25	8.00	9.60	11.15	13.65	16.15
18	....	....	9.50	12.00	14.50	18.00	21.50
20	....	....	12.50	15.50	19.00	23.00	27.00
22	....	....	15.50	19.00	23.50	28.00	32.50
24	....	....	18.50	23.00	28.00	33.50	39.00
26	....	....	.....	.....	33.00	39.00	45.50
28	....	....	.....	.....	38.00	45.00	52.50
30	....	....	.....	.....	44.00	52.00	60.00

Diameter Inches	Thickness of Wheel, Inches 7/8	1	1¼	1½	1¾	2	2¼
1	$.90	$.95	$1.00	$1.10	$1.20	$1.30	.....
1½	1.00	1.05	1.10	1.20	1.30	1.40	.....
2	1.10	1.15	1.25	1.35	1.45	1.55	$1.65
2½	1.20	1.25	1.40	1.50	1.70	1.85	2.00
3	1.45	1.55	1.70	1.80	2.00	2.15	2.35
3½	1.75	1.85	2.05	2.25	2.45	2.65	2.90
4	2.10	2.25	2.50	2.75	3.00	3.25	3.55
4½	2.50	2.75	3.05	3.35	3.65	3.95	4.30
5	2.95	3.35	3.70	4.05	4.40	4.75	5.15
6	3.55	4.05	4.50	5.15	5.70	6.25	6.80
7	4.25	4.90	5.60	6.50	7.30	8.10	8.80
8	5.25	6.00	6.90	8.00	9.00	10.00	11.00
9	6.45	7.40	8.55	9.90	11.15	12.40	13.65
10	7.90	9.10	10.50	12.10	13.60	15.10	16.70
12	10.20	11.80	13.80	16.00	18.10	20.20	22.50
14	13.60	15.75	18.60	21.65	24.60	27.00	30.00
16	19.10	22.00	25.00	28.00	31.00	34.00	37.50
18	25.00	28.50	32.00	35.50	39.50	44.00	48.50
20	31.00	35.00	39.00	43.50	49.00	54.50	60.00
22	37.00	42.00	47.00	52.00	59.00	66.00	72.00
24	44.00	49.00	56.00	63.00	70.00	78.00	86.00
26	52.00	59.00	68.00	76.00	85.00	95.00	104.00
28	60.00	70.00	80.00	90.00	101.00	112.00	123.00
30	68.00	81.00	94.00	106.00	118.00	130.00	142.00
32	.....	92.00	107.00	121.00	136.00	150.00	165.00
34	.....	103.00	120.00	137.00	154.00	170.00	186.00
36	.....	114.00	133.00	152.00	171.00	190.00	208.00

Diameter Inches	Thickness of Wheel, Inches 2½	2¾	3	3¼	3½	3¾	4
2	$1.75	$1.85	$1.95	.....	.....	.....	.....
2½	2.15	2.30	2.45	.....	.....	.....	.....
3	2.55	2.75	2.95	$3.15	$3.35	$3.55	$3.75
3½	3.15	3.40	3.65	3.90	4.15	4.40	4.65
4	3.85	4.15	4.45	4.75	5.05	5.35	5.65
4½	4.65	5.00	5.35	5.70	6.05	6.40	6.75
5	5.55	5.95	6.35	6.75	7.15	7.55	7.95
6	7.35	7.90	8.65	9.25	9.85	10.45	11.05
7	9.50	10.20	11.10	11.85	12.65	13.45	14.25
8	12.00	13.00	14.00	15.00	16.00	17.00	18.00
9	14.90	16.15	17.40	18.65	19.90	21.15	22.40
10	18.30	19.90	21.50	23.10	24.70	26.30	27.90
12	24.80	27.10	29.30	31.50	33.70	36.00	38.20
14	32.60	35.20	37.70	40.30	43.20	46.20	49.20
16	41.00	44.50	48.00	51.50	55.00	58.50	62.00
18	53.00	57.50	62.00	66.50	71.00	75.50	80.00
20	65.50	71.00	76.50	82.00	87.50	93.00	98.50
22	78.00	85.00	92.00	99.00	106.00	113.00	120.00
24	94.00	102.00	110.00	118.00	126.00	134.00	142.00
26	113.00	122.00	131.00	140.00	150.00	160.00	170.00
28	134.00	145.00	156.00	167.00	178.00	189.00	200.00
30	155.00	168.00	181.00	194.00	206.00	218.00	230.00
32	179.00	194.00	208.00	223.00	237.00	252.00	264.00
34	202.00	218.00	234.00	250.00	266.00	282.00	298.00
36	226.00	244.00	262.00	280.00	298.00	316.00	334.00

Wheels thinner than 3/32 inch take the list price of a wheel 3/32 inch thick.

Standard Straight Grinding Wheels

Rubber Bonded

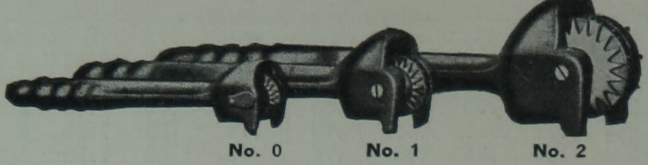
Price Each

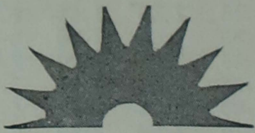
Diam. In.	Thickness of Wheels, Inches 1/32	1/16	1/8	1/4	3/8	1/2	5/8	3/4
1	$.25	$.25	$.30	$.45	$.50	$.55	$.65	$.75
1½	....	....	....	.50	.55	.65	.75	.85
2	.35	.35	.45	.55	.65	.75	.85	1.00
2½	....	....	....	.65	.75	.85	1.00	1.15
3	.45	.50	.60	.75	.85	1.00	1.15	1.35
3½	....	....	....	.85	1.00	1.15	1.35	1.60
4	.60	.70	.80	1.00	1.15	1.35	1.60	1.85
4½	....	....	....	1.15	1.35	1.60	1.90	2.20
5	.80	.90	1.00	1.30	1.55	1.85	2.20	2.55
6	1.00	1.10	1.20	1.65	2.05	2.45	2.90	3.35
7	1.20	1.30	1.40	2.05	2.60	3.15	3.70	4.25
8	1.40	1.50	1.60	2.50	3.20	3.90	4.60	5.35
9	1.60	1.70	1.80	3.00	3.85	4.75	5.65	6.55
10	1.80	1.90	2.00	3.60	4.60	5.70	6.80	7.85
12	2.15	2.25	2.40	4.85	6.30	7.80	9.25	10.75
14	....	2.65	2.80	6.30	8.20	10.10	12.00	13.90
16	....	....	3.50	7.90	10.25	12.65	15.05	17.40
18	....	....	....	9.60	12.50	15.40	18.30	21.20
20	....	....	....	11.50	14.95	18.40	21.90	25.35
22	....	....	....	13.55	17.60	21.65	25.75	29.80
24	....	....	....	15.70	20.40	25.10	29.85	34.55
26	....	....	....	18.05	23.45	28.85	34.25	39.65
28	....	....	....	20.55	26.65	32.80	38.90	45.05
30	....	....	....	23.20	30.05	36.95	43.85	50.75

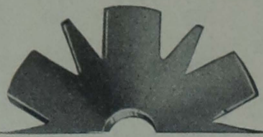
Diam. In.	Thickness of Wheels, Inches 7/8	1	1¼	1½	1¾	2	2¼
1	$.85	$1.00	$1.15	$1.35	$1.55	$1.75	$1.95
1½	1.00	1.15	1.35	1.55	1.75	2.00	2.25
2	1.15	1.30	1.55	1.80	2.05	2.30	2.60
2½	1.35	1.50	1.80	2.10	2.40	2.75	3.10
3	1.55	1.75	2.10	2.45	2.85	3.25	3.65
3½	1.80	2.05	2.45	2.90	3.35	3.80	4.25
4	2.10	2.40	2.90	3.40	3.90	4.40	4.95
4½	2.50	2.80	3.35	3.90	4.50	5.10	5.70
5	2.90	3.25	3.90	4.55	5.20	5.85	6.55
6	3.80	4.25	5.10	5.95	6.85	7.75	8.65
7	4.85	5.45	6.60	7.75	8.90	10.05	11.25
8	6.10	6.85	8.30	9.75	11.20	12.65	14.15
9	7.45	8.35	10.10	11.90	13.70	15.50	17.30
10	8.95	10.05	12.05	14.05	16.05	18.05	20.05
12	12.20	13.70	16.55	19.40	22.25	25.10	27.95
14	15.80	17.75	21.55	25.35	29.15	32.90	36.70
16	19.80	22.20	26.95	31.70	36.45	41.15	45.90
18	24.10	27.05	32.85	38.60	44.40	50.15	55.95
20	28.80	32.30	39.20	46.10	53.00	59.90	66.80
22	33.85	37.95	46.10	54.20	62.30	70.40	78.55
24	39.25	44.00	53.45	62.85	72.25	81.65	91.10
26	45.05	50.45	61.25	72.05	82.85	93.65	104.45
28	51.15	57.30	69.60	81.85	94.15	106.40	118.70
30	57.65	64.55	78.40	92.20	106.00	119.90	133.75

Diam. In.	Thickness of Wheels, Inches 2½	2¾	3	3¼	3½	3¾	4
1	$2.15	$2.35	$2.50	$2.70	$2.90	$3.10	$3.25
1½	2.45	2.65	2.85	3.10	3.30	3.50	3.70
2	2.85	3.10	3.35	3.60	3.85	4.10	4.35
2½	3.40	3.70	4.00	4.30	4.60	4.90	5.20
3	4.05	4.40	4.75	5.15	5.50	5.85	6.20
3½	4.70	5.15	5.60	6.05	6.45	6.90	7.30
4	5.45	6.00	6.50	7.00	7.50	8.00	8.50
4½	6.30	6.90	7.50	8.10	8.70	9.30	9.90
5	7.25	7.95	8.60	9.30	10.00	10.70	11.40
6	9.55	10.45	11.30	12.25	13.15	14.10	15.00
7	12.40	13.55	14.70	15.90	17.10	18.30	19.50
8	15.60	17.05	18.50	20.00	21.45	22.95	24.40
9	19.10	20.90	22.70	24.50	26.25	28.05	29.80
10	22.05	24.05	26.05	28.05	30.05	32.05	34.00
12	30.80	33.65	36.50	39.35	42.20	45.05	47.90
14	40.50	44.30	48.05	51.80	55.55	59.30	63.00
16	50.65	55.40	60.10	64.80	69.50	74.20	78.85
18	61.70	67.50	73.25	79.00	84.75	90.50	96.20
20	73.70	80.60	87.50	94.40	101.30	108.20	115.05
22	86.65	94.75	102.85	111.00	119.15	127.30	135.40
24	100.50	109.90	119.30	128.80	138.30	147.80	157.25
26	115.25	126.05	136.85	147.80	158.75	169.70	180.60
28	130.95	143.25	155.50	168.00	180.50	193.00	205.45
30	147.60	161.45	175.25	189.40	203.55	217.70	231.80

Desmond-Huntington Grinding Wheel Dressers and Cutters




Nos. 0, 1 and 2 Style


Nos. 0, 1 and 2 Stag Tooth Style

Used on wheels where quick action is necessary.

No. 0 is the ordinary Huntington type. Nos. 1 and 2 are fitted with patent bearings; bushings revolving on a spindle between two washers, all hardened and tempered.

No. 0

*Hooded Dresser, Complete with Two Sets Cutters...	$.75
Tool Steel Cutters, 1⁵⁄₁₆″ Diameter......per doz. sets	1.00

No. 1

Hooded Dresser, 12″ Long, Complete................	$1.50
Extra Cutters, 4 in Set, 1½″ Diameter.per doz. sets	2.00

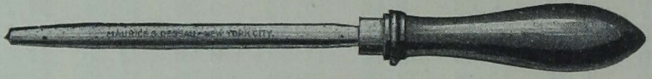
No. 2

Hooded Dresser, 15″ Long, Complete................	$2.50
Extra Cutters, 6 in Set, 2⅜″ Diameter..per doz. sets	6.00

*Also furnished plain without hood.

Stag tooth cutters same price as regular cutters.

Diamond Hand Tool Emery Wheel Dressers



Size 7⁄16x6 inches, length over all 10 inches.

Has high quality Carbon (black diamonds) or Bortz (rough diamonds).

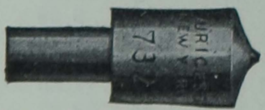
Indispensable where accuracy in grinding is desired. It keeps the face of the grinding wheel true and enables the grinder to produce work of the highest degree of accuracy.

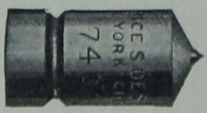
Diamonds are brazed in tool steel settings without burning, chipping or injuring the stone in any possible manner. The diamonds will not work loose in settings.

No.	Stone Karat	Price Each	No.	Stone Karat	Price Each	No.	Stone Karat	Price Each
1	½	$5.00	3	1	$19.00	7	2½	$60.00
1A	⅝	8.00	4	1¼	25.00	8	3	78.00
2	¾	12.00	5	1½	39.00	9	3½	85.00
2A	⅞	15.00	6	2	49.00	...	...	.....

Diamond Grinder Tools

Set with Bortz (Rough Diamonds)


Landis Nib

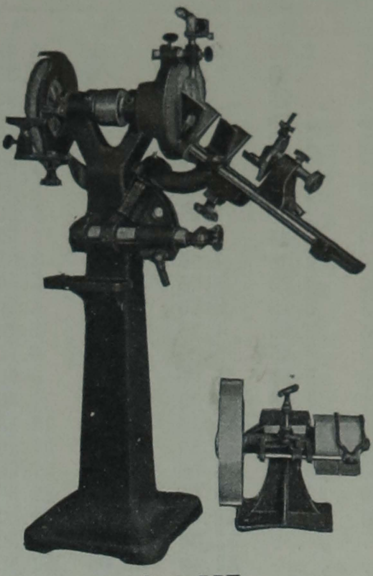

Norton Nib

The Landis Nib is ⅜ inch in diameter, milled to ¼-inch shank, and is 15⁄16 inch long over all.

The Norton Nib is 7⁄16 inch in diameter, 13⁄16 inch long over all.

No.	Size Stone Karats	Price Each	No.	Size Stone Karats	Price Each	No.	Size Stone Karats	Price Each
1	½	$5.00	3	1	$19.00	7	2½	$60.00
1A	⅝	8.00	4	1¼	25.00	8	3	78.00
2	¾	12.00	5	1½	39.00	.	...	.....
2A	⅞	15.00	6	2	49.00	.	...	.....

Yankee Improved Single End Dry Drill Grinder


Style BPT

A machine of the single holder dry grinder type, with point thinning attachment and separate countershaft. The holder accommodates all sizes and styles of straight, taper or collared shank twist drills.

The machine, having its countershaft overhead, can be placed at a distance from the line shaft.

Wheel dresser conveniently located on wheel hood keeps face of grinding wheel in perfect condition.

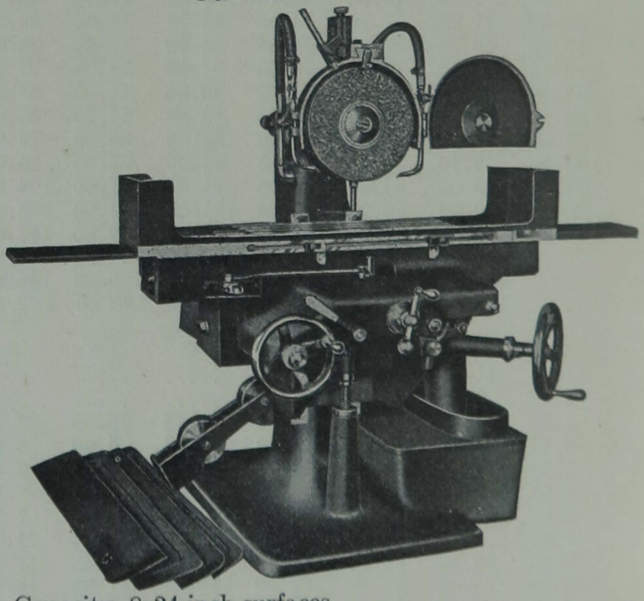
The countershaft being self-contained, is easily put up.

Belt Drive

Style	Drill Size Cap. In.	Diam. Grinding Wheels In.	Height to Center Spindle In.	Speed of Wheel R.P.M.	Diam. T & L. Pulley In.	Speed Countershaft R.P.M.	H.P.	Floor Space In.	Weight Crated Lbs.
B-Pt.	¼–2½	9½	42	1900	6x2¼	633	1	18x36	385
JB-Pt.	3⁄32–1½	9½	42	1900	6x2¼	633	1	18x36	375
Motor Drive									
B-Pt.	¼–2½	9½	..	1750	.....	...	1½	18x52	675
JB-Pt.	3⁄32–1½	9½	..	1750	.....	...	1½	18x47	675

Prices upon application.

No. 3 W. & M. Automatic Wet Surface Grinders



Capacity, 8x24-inch surfaces.
Working surface of table, 8x24 inches.
Longitudinal travel of table, 25 inches.
Table feed longitudinally, 168 inches per minute.
Transverse travel, 9 inches.
Automatic feed per stroke of table, .015 to .100 inches.
Will take wheels up to 12x1 inches.
Spindle speed, 1600 revolutions per minute.
Tight and loose pulleys, 10x4 inches.
Speed countershaft, 550 revolutions per minute.
Width wheel spindle belt, 5 inches.
Power required, 5 horse power.
Floor space, 96x61 inches. Shipping weight, 2300 pounds.
Prices upon application.

No. 1 Clizbe Standard Pattern Grinders

The No. 1 Machine is intended for light work and is built with split cast iron bearings. Provision is made for attaching tool rests. Wheel guards attach to bench or to top plate of column where column is furnished, and are of cast iron open face type.

No.		**1**
Size Wheel	inches	6x1
Length Spindle	inches	11
Diameter Spindle in Bearing	inches	¾
Diameter Spindle on End	inches	⅝
Size Pulley	inches	1⅞x1½
Distance Between Wheels	inches	6
Height to Center of Spindle from Table	inches	5
No. 1, Head Only	each	**$4.50**

No. 2 Clizbe Standard Pattern Grinders

The No. 2 machine is built with babbitted bearings and is fitted with tool rests of knuckle-jointed type. Bearings are dust proof and are fitted with nickel-plated oil cups. Guards of cast iron open face type for use with this machine attach to top plate of column or to bench when column is not used.

No.	Wheel Size Inches	Length Spindle Inches	Diam. Spindle in Bearing Inches	Diam. Spindle on End Inches	Size Pulley Inches	Distance Between Wheels Inches	Height to Center of Spindle from Table Inches	Head Only Price Each
2	8x1¼	14	⅞	¾	2⅜x2	8	6¼	**$9.00**

Clizbe Standard Pattern Grinders

No. 3

Nos. 3, 4 and 5 machines are exactly alike as to design and construction, the only difference being in the size.

All three of these machines have babbitted bearings and are fitted with wick-oiling arrangement as insurance against faulty lubrication.

Rests are of the knuckle-jointed type. Wheel guards attach to top plate of column or to bench where column is not used in connection with head.

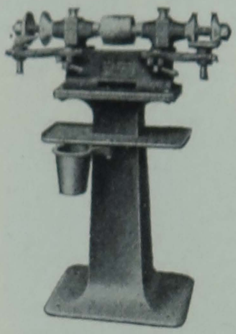
Nos. 3, 4 and 5 countershafts recommended for use with Nos. 3, 4 and 5 machines respectively.

The use of cast iron column is strongly recommended as being the most satisfactory method of mounting these machines especially for the larger sizes.

No.		**3**	**4**	**5**
Wheel Size	inches	10x1½	12x2	14x2
Bore of Wheels	“	1	1	1¼
Distance Between Wheels	“	10	14¾	16
Height Table to Center of Spindle	inches	7½	8	8¼
Height of Column	“	31	28⅛	27½
Size of Pulley	“	3½x2⅝	4¼x3½	4¾x4
Length of Spindle	“	18	24	27
Diameter of Spindle Bearing	“	1$\frac{1}{16}$	1$\frac{1}{16}$	1$\frac{5}{16}$
Price, Head Only	each	**$15.30**	**$21.15**	**$27.00**
“ Column Only	“	**14.75**	**18.35**	**23.50**
“ Countershaft	“	**13.30**	**17.55**	**22.50**
Wheel Guards		**4.15**	**5.95**	**8.10**

St. Louis Grinding Machines

For Detached Countershaft



Boxes are dustproof, lined with high grade anti-friction metal, provided with oil cellars and are self-oiling. On order, can be lined with Randall graphite, removable cast iron or bronze shell bearings.

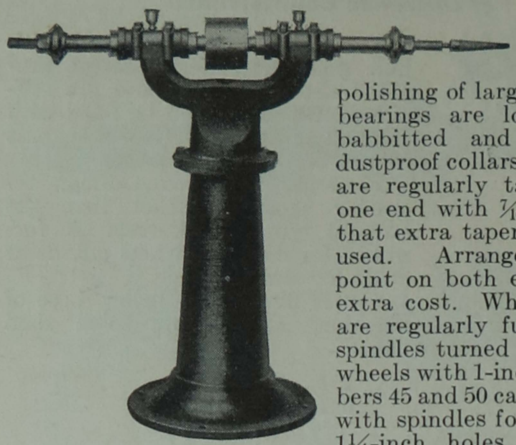
Rests are of improved design, requiring shorter bracket than the straight type. Back rests are furnished for receiving wheel guards or other fixtures.

Pan is five inches below base of machine, giving more room than usual.

Machine No.	**1**	**2**	**3**
Size Wheels.........in.	6x1½	8x1½	10x2
Diam. Arbor in Collars “	⅝	¾	⅞
Length of Arbor..... “	17	20	22
Distance between Wheels..... “	10¾	12	14½
Height to Center of Arbor.... “	4½	5½	6½
Floor “ “ “ “ .... “	38	39	39
Size of Base of Column “	10x14	11x15½	12x16
“ Plain Pulley..... “	2x2	2½x2½	3x3
“ T & L “ .... “	2½x2	3x2	3½x2½
Speed C. Shaft, Plain Pulley . r. p. m.	531	497	478
Size C. S. Drive “ “ ... in.	12x2	12x2½	12x3
“ “ T & L Pulley....... “	4x2½	4x3	6x3
Weight of Head . pounds	22	33	52
“ “ Column “	75	95	105
“ “ C. S.... “	50	55	60
“ Complete “	147	183	217
Price, Head........each	**$19.00**	**$22.00**	**$25.00**
“ Column..... “	**17.00**	**20.00**	**23.00**
“ Countershaft Plain.. “	**16.00**	**17.00**	**20.00**
Price, Countershaft Pull.... “	**23.00**	**26.00**	**28.00**
“ “ Self-oiling “	**19.00**	**21.00**	**24.00**
“ Complete Mach. Plain C.S “	**52.00**	**59.00**	**68.00**
“ “ “ Pull C.S. “	**59.00**	**68.00**	**76.00**
Price, Complete Mach. Self-oiling C. S...each	**55.00**	**63.00**	**72.00**
Price, Extra for T & L Pulley on Head..each	**4.00**	**4.00**	**4.00**
Price, Wheel Guards.....per pair	**8.00**	**9.00**	**11.00**

Machine No.	**4**	5	**6**
Size Wheels.........in.	12x2	14x2½	16x3
Diam. Arbor in Collars “	1	1⅛	1¼
Length of Arbor..... “	26	30	34
Distance between Wheels..... “	18	21	23½
Height to Center of Arbor .... “	7½	8½	9
Floor “ “ “ “ .... “	39	39	40
Size of Base of Column “	13½x17½	15x20	18x25
“ Plain Pulley..... “	3½x3½	4x4	6x4½
“ Cone “ .... “	......	......	6&5x4½
“ T & L “ .... “	3½x3½	4x4	6x4
Speed C Shaft, Plain Pulley........r. p. m.	465	455	572
Speed C Shaft, Cone Pulley........r. p. m.	......	......	512
Size C. S. Drive Plain Pulley...........in.	12x3½	12x4	14x4½
Size C. S. Drive Cone Pulley...........in.	......	......	14&15x4½
Size C. S. T & L Pulley “	6x3½	6x4	8x5
Weight of Head . pounds	75	100	150
“ “ Column “	120	160	220
“ “ C. S... “	70	85	150
“ Complete. “	265	345	520
Price, Head........each	**$31.00**	**$39.00**	**$51.00**
“ Column . “	**28.00**	**33.00**	**45.00**
“ Countershaft, Plain . “	**23.00**	**26.00**	......
Price, Countershaft Pull.....each	**31.00**	**34.00**	**47.00**
“ “ Self-oiling “	**27.00**	**30.00**	**34.00**
“ Complete Mach. Plain C.S. “	**82.00**	**98.00**	**130.00**
“ “ “ Pull C.S. “	**90.00**	**106.00**	**143.00**
Price, Complete Mach. Self-oiling C. S...each	**86.00**	**102.00**	**130.00**
Price, Extra for T. & L. Pulley on Head..each	**6.00**	**6.00**	**8.00**
Price, Wheel Guards.....per pair	**12.00**	**16.00**	**19.00**

Clizbe Polishing Stands

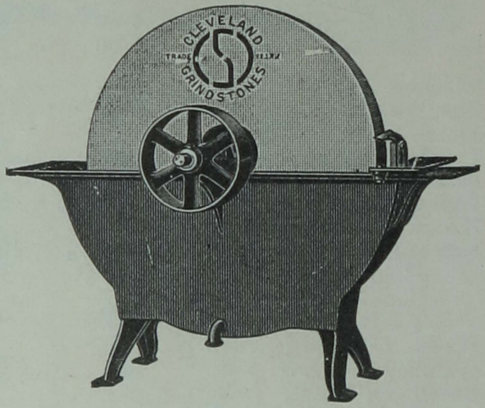


Has ample clearance to permit of the polishing of large pieces. The bearings are long and well babbitted and fitted with dustproof collars. The spindles are regularly tapped out on one end with 7⁄16-inch hole so that extra taper point can be used. Arranged for taper point on both ends at slight extra cost. While all 3 sizes are regularly furnished with spindles turned down to take wheels with 1-inch holes, numbers 45 and 50 can be furnished with spindles for wheels with 1¼-inch holes at no extra cost. Machines can be fitted with either single or tight and loose pulleys but will always be fitted with single pulley unless otherwise specified.

Machines are furnished without column for bench use if so desired but this method of mounting is not recommended.

Machine No.	45	50	55
Wheel Size Recommended.....inches	12	10	8
Length of Spindle.............inches	42	38	34
Diam. Spindle in Bearings.....inches	1⅝	1⅜	1⅛
Diam. Spindle Between Collar. inches	1	1	1
Distance Between Wheels......inches	33	30	28
Size of Pulley................inches	4x5	4x4½	3x3½
Height to Center of Spindle....inches	38	38	38
Shipping Weight, Head Only ..pounds	125	100	90
Shipping Weight, with Column pounds	225	195	160
Price, Head Only..............each	**$35.10**	**$33.75**	**$25.55**
Price, Column..................each	**18.90**	**17.65**	**14.05**
Price, Countershaft............each	**27.00**	**25.20**	**25.20**
Price, Taperpoints.............each	**3.60**	**3.60**	**3.60**
Price, Complete................each	**84.60**	**79.20**	**68.40**

Cleveland Keystone Grindstones



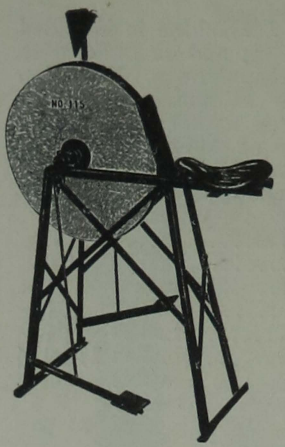
Trough is a thick and heavy casting and will last indefinitely.

Cast in one piece, legs cast separately.

When stone is worn out, hub may be returned and refitted to a new stone. Unless otherwise ordered Keystone is shipped set up.

No.	Diam. of Stone Inches	Thickness of Stone Inches	Size of Shaft at Bearings Inches	Ship. Wt., Lbs. Frame and Fixtures	Price, Each Complete with Stone	Price, Each Frame with Shaft Pulley and Tool Rest	Price, Each Frame Only without Shaft Bearing or Tool Rest
302K	30	3	1	250	**$73.00**	**$66.00**	**$42.00**
303K	30	3½	1	250	**74.00**	**66.00**	**42.00**
304K	30	4	1	250	**76.00**	**66.00**	**42.00**
305K	30	4½	1	250	**78.00**	**66.00**	**42.00**
364K	36	4 to 4½	1¼	450	**92.00**	**78.00**	**56.00**
365K	36	4½ " 5	1¼	450	**94.00**	**78.00**	**56.00**
366K	36	5½ " 6	1¼	450	**98.00**	**78.00**	**56.00**
385K	38	4½ " 5	1¼	450	**96.00**	**78.00**	**56.00**
386K	38	5½ " 6	1¼	450	**100.00**	**78.00**	**56.00**
405K	40	4½ " 5	1¼	450	**98.00**	**78.00**	**56.00**
406K	40	5½ " 6	1½	450	**102.00**	**78.00**	**56.00**
465K	46	4½ " 5	1½	700	**130.00**	**104.00**	**70.00**
466K	46	5½ " 6	1½	700	**134.00**	**104.00**	**70.00**
485K	48	4½ " 5	1½	700	**132.00**	**104.00**	**70.00**
486K	48	5½ " 6	1½	700	**136.00**	**104.00**	**70.00**
488K	48	7½ " 8	1¾	700	**150.00**	**104.00**	**70.00**
506K	50	5½ " 6	1¾	700	**140.00**	**104.00**	**70.00**
508K	50	7½ " 8	1¾	700	**160.00**	**104.00**	**70.00**

No. 115 Cleveland Mounted Grindstones



This grindstone is designed to satisfy the demand for a low priced grindstone.

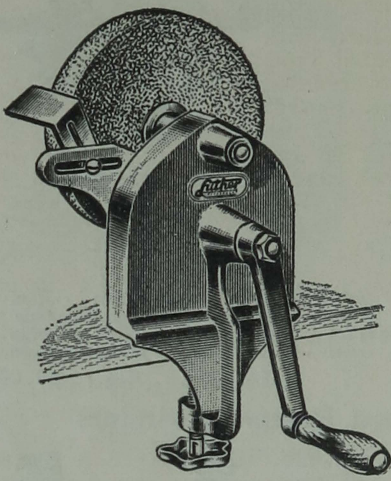
The frame is constructed of 1x⅝-inch angle steel substantially braced. It is fitted with ball bearings on shaft and crank and malleable iron detachable grindstone fixtures and mounted with a good Ohio stone properly hung.

The stone only is crated and attached to frame for shipping.

Weight, about 75 pounds.

Price, No. **115**.... ...each **$12.50**

Milwaukee Brand Tool Grinders



Design and construction bring the gear case entirely over the bench, giving a more solid mounting and with a minimum of vibration. Height of case also permits the use of larger wheel sizes and the work is elevated to a more convenient place.

Equipped with a Dimo-Grit Wheel.

One piece gray iron gear case, enclosed and dust-proof, flanged inwardly for oil retaining.

Bearings heavy, long and evenly divided, adding to ease of operation and life of all parts.

Spur cut gears, accurately made, wide face drive gear.

Rust-proofed adjustable work rest.

Crank fastened with key and taper socket plus a nut on the outside making a positive slip-proof mounting.

Bench screw permits use anywhere; steel screw with sturdy notched iron hand grip.

Baked on orange-red finish.

No.	M4	M5	M6	M7
Each	**$2.30**	**3.14**	**4.20**	**4.72**
Size..........in.	4	5	6	7
Size Wheel.......in.	4x1x5⁄16	5x1x⅜	6x1x⅜	7x1x⅜
Weight..........lbs.	5	7¼	9¼	10½

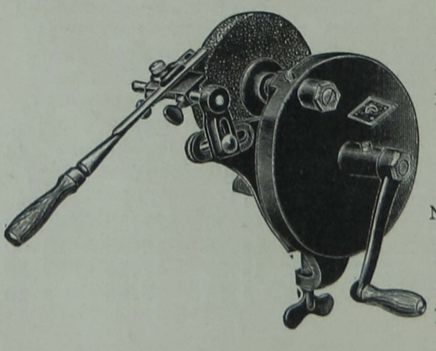
Luther Dimo-Grit Grinders

Mechanic Special Type

For garage or shop.

One-piece case contains all bearings and working parts. All bearings are extra long and heavy and are chambered to retain oil. Wheel is medium grit.

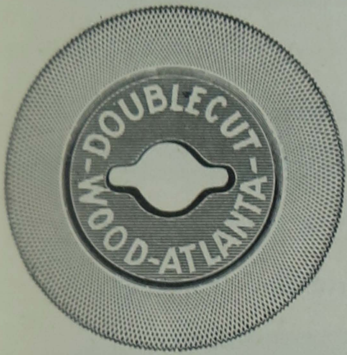
Enamel finish.



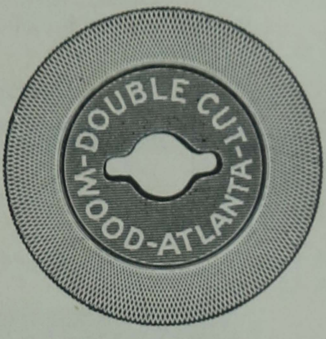
No.	Size Wheel In.	Ship. Wt. Lbs.	Price Each
14	4x1x1	9½	$5.75
15	5x1x1	13	6.50
16	6x1x1	16½	8.50
17	7x1¼x1	26	12.00

Wood's Gin Saw Files and Gummers

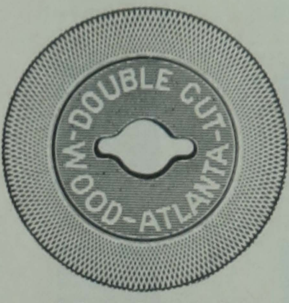
Linter Edge Cut Gummers and Files
For use on all Carver, Creasy, Helm and Atlanta Utility Machines


DOUBLE CUT
WOOD-ATLANTA

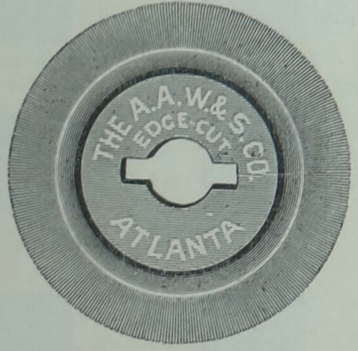
1⅝ Inch Double Cut


DOUBLE CUT
WOOD-ATLANTA

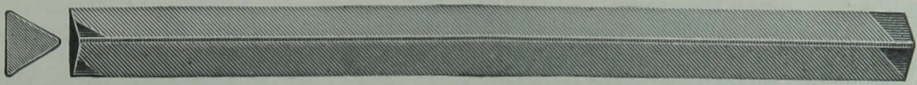
1½ Inch Double Cut


DOUBLE CUT
WOOD-ATLANTA

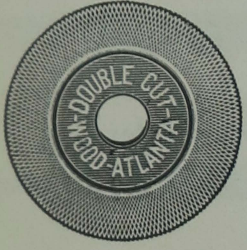
1¼ Inch Double Cut
1⅜ Inch Double Cut


THE A.A.W.&S.CO.
EDGE CUT
ATLANTA

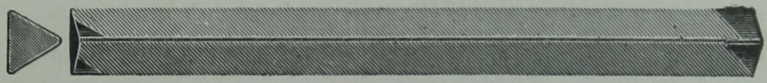
1⅝ Inch Single Cut



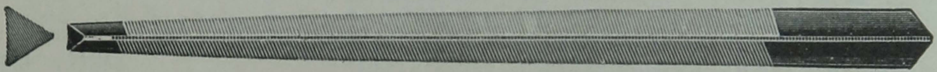
6½ Inch and 4 Inch Special Straight Linter Files


DOUBLE CUT
WOOD-ATLANTA

1⅛ Inch Double Cut



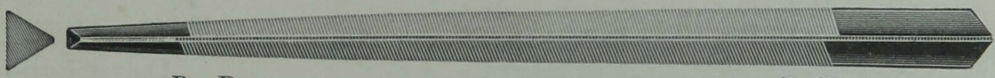
3¼ Inch for Helm Machine



3½ and 4 Inch Taper Linter File for 141 Saws

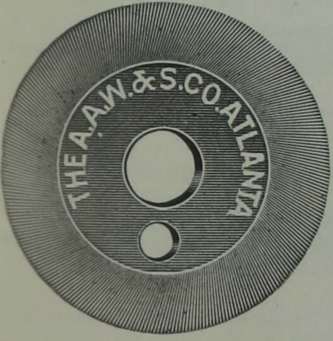
Prices Quoted on Application

Duplex Full Length Files



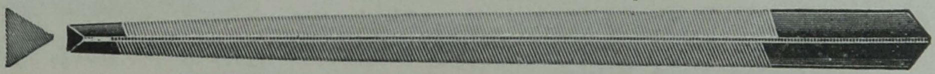
Per Dozen.. $1.50

Wood's Roachback For All Machines


THE A.A.W.&S.CO.ATLANTA

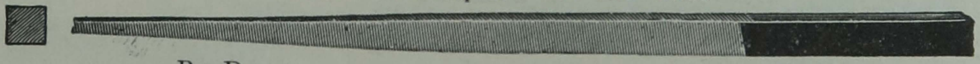
Singlecut.........per doz. $3.00
Doublecut........per doz. 3.25

Four Inch Files for Triplex



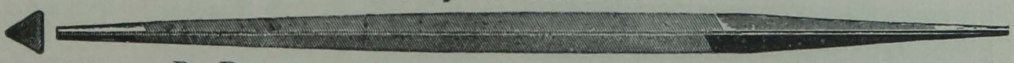
Per Dozen.. $1.50

Four Inch Square Gin Saw Files



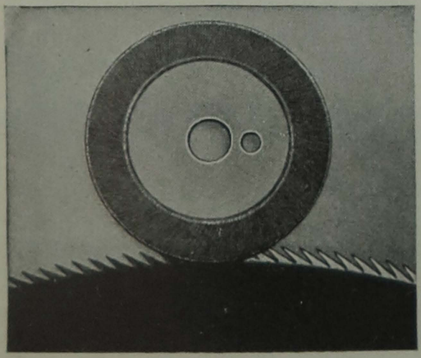
Per Dozen.. $2.00

Bradley Gin Saw Files



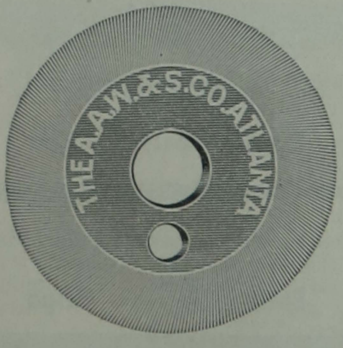
Per Dozen.. $2.00

Rotary Side Files for Duplex Rotary Filer-Gummer



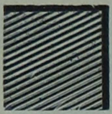
File teeth on both sides.
Per Dozen.. $2.50

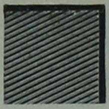
Duplex Standard for all Machines

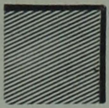

THE A.A.W.&S.CO.ATLANTA

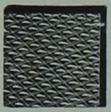
Singlecut...................................per doz. $2.50
Doublecut..................................per doz. 2.75

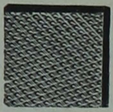
Delta Files

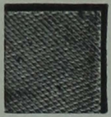

Mill, Bastard

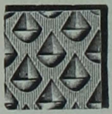

Mill, Second Cut

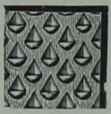

Mill, Smooth

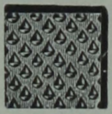

Double Cut
Bastard


Double Cut
Second Cut


Double Cut
Smooth


Rasp Cut
Horse

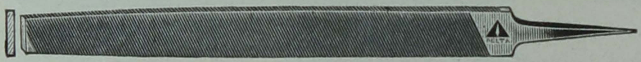

Rasp Cut
Wood


Rasp Cut
Cabinet

Grades.—The grades are divided as follows: Rough bastard, second cut, smooth and dead smooth.

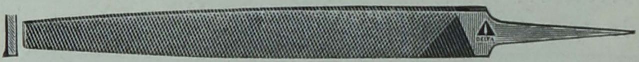
These five grades are the most in use, and are made from or by two separate cuts on the file, which forms a diamond shaped tooth. The first cut which is put on the file is known as the "over cut," and the second as the "up cut." For mill saw and taper saw files, only the "over cut" is used to form the tooth, the tooth being a sharp ridge of metal extending at a sharp angle across the face of the file, and not intersected by any other stroke of the cutting chisel. This last tooth, as applied to mills and tapers, goes under the two grades of bastard and second cut. The only other tooth which is in use, is that applied to horse rasps, wood rasps, cabinet rasps and shoe rasps. This tooth is raised to a conical form by the use of a punch. On horse rasps it is too large to designate by any grade of cut. On wood and cabinet rasps it is graded under the head of bastard smooth, and sometimes second cut.

Delta Mill Files



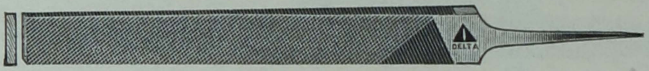
Sizes 4 to 10-inch inclusive are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Flat Files



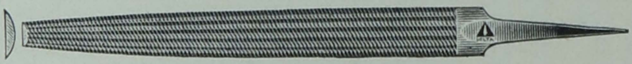
Sizes 6 to 10-inch inclusive are packed 12 in a box; 12 inch and over, 6 in a box.

Delta Hand Files



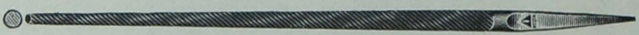
Sizes 4 to 8-inch inclusive are packed 12 in a box; 10-inch and over, 6 in a box.

Delta Half Round Files



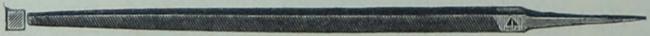
Sizes 6 to 10-inch inclusive are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Round Files



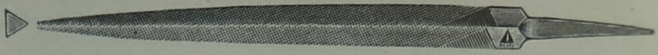
Sizes 6 to 10-inch inclusive are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Square Files



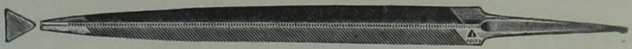
Sizes 6 to 10-inch inclusive are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Three-Square Files



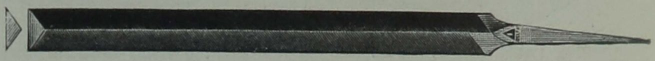
Sizes 6 to 10-inch inclusive are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Taper Files



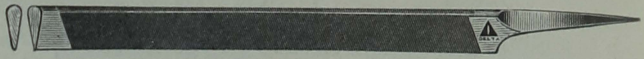
Sizes 4 to 10-inch inclusive are packed 12 in a box; 12-inch, 6 in a box.

Delta Cant Saw Files



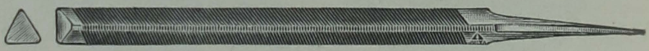
Packed 12 in a box.

Delta Great American Cross Cut Files



Packed 12 in a box.

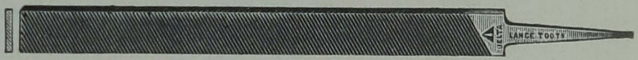
Delta Bandsaw Files



Packed 12 in a box.

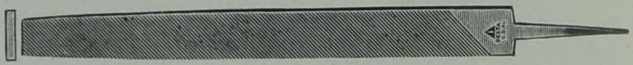
Delta Lance Tooth Files

For Cross Cut Saws



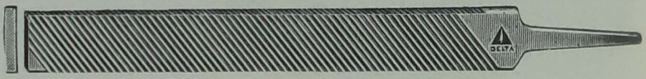
Packed 12 in a box.

Delta Long Angle Lathe Files



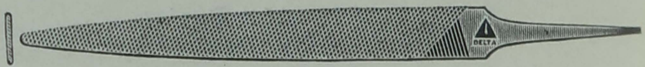
The 10-inch size is packed 12 in a box; other sizes 6 in a box.

Delta Utility Files



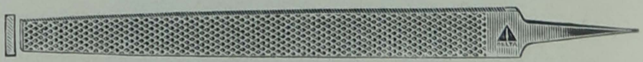
The 6 and 8-inch sizes are packed 12 in a box; 10-inch and over, 6 in a box.

Delta Warding Files



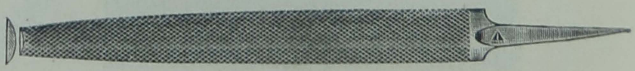
Packed 12 in a box.

Delta Flat Wood Rasps



Sizes 8 and 10-inch are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Half Round Wood Rasps



Sizes 6 to 10-inch inclusive are packed 12 in a box; 12-inch and over, 6 in a box.

Delta Files and Rasps

List Adopted April 2, 1923 by the File Manufacturers' Association of United States

Price, per Dozen

Size In.	Mill Bast.	Mill 2d Cut	Mill Smooth	Mill 1 R. E. Bast.	Mill 1 R. E. 2d Cut	Mill 2 R. E. Bast.	Mill 2 R. E. 2d Cut	Mill Blunt Bast.	Mill Blunt 2d Cut	Tapers Sgl. Cut	Tapers Dbl. Cut	Slim Tapers	Extra Slim Tapers	Double Extra Slim Tapers
3	$3.00	....	....	....	....	....	....	....	....	$2.10	....	$2.10	....	....
3½	....	....	....	....	....	....	....	....	....	2.10	....	2.10	....	....
4	3.00	$3.50	....	....	....	....	....	....	....	2.20	$2.90	2.20	$2.20	$2.20
4½	....	....	....	....	....	....	....	....	....	2.40	3.10	2.30	2.30	2.30
5	3.20	3.80	....	....	....	....	....	....	....	2.60	3.50	2.50	2.50	2.50
5½	....	....	....	....	....	....	....	....	....	3.00	....	2.90	2.90	2.90
6	3.50	4.00	$4.50	$3.90	$4.50	$4.40	$5.00	$3.90	$4.60	3.40	4.70	3.10	3.10	3.10
7	3.90	4.60	....	4.40	5.20	4.90	....	4.30	4.90	4.30	5.60	3.80	3.80	3.80
8	4.30	4.90	5.40	4.80	5.50	5.40	6.10	4.90	5.80	5.40	6.70	4.50	4.50	4.50
9	4.90	5.80	....	5.50	6.50	6.10	....	....	....	....	....	....	....	....
10	5.60	6.40	7.00	6.30	7.20	7.00	8.00	6.70	7.80	8.10	....	6.40	....	....
12	7.50	8.60	9.40	8.40	9.70	9.40	10.80	....	....	12.50	....	9.50	....	....
14	10.70	12.20	13.10	12.00	....	....	....	....	....	....	....	....	....	....
16	14.70	16.80	17.90	....	....	....	....	....	....	....	....	....	....	....
18	20.20	.....	.....	....	....	....	....	....	....	....	....	....	....	....

Size In.	Hand-Saw Blunt	Band Saw Blunt & Taper Regular	Band Saw Blunt & Taper Slim	Pitsaw	Size In.	Flat Bast.	Flat 2d Cut	Flat Smooth	Hand Bast.	Hand 2d Cut	Hand Smooth	Square Bast.	Square 2d Cut	Square Smooth	Three Square Bast.	Three Square 2d Cut	Three Square Smooth
3	....	....	....	....	4	$3.70	$4.30	$4.70	$3.70	$4.30	$4.80	$3.80	$4.60	$4.90	$4.80	$5.60	$6.10
3½	....	....	....	....	5	3.90	4.60	4.90	3.90	4.70	5.30	4.10	4.80	5.30	5.40	6.10	6.40
4	$2.60	$2.90	....	$4.80	6	4.30	4.80	5.30	4.30	5.10	5.60	4.60	5.10	5.50	6.10	6.70	7.10
4½	3.00	3.10	....	5.40	7	4.80	5.50	6.10	4.90	5.80	6.30	5.10	5.80	6.30	7.00	7.70	8.20
5	3.40	3.50	....	5.40	8	5.30	6.10	6.60	5.40	6.30	6.70	5.50	6.30	7.00	7.50	8.30	8.90
5½	....	....	....	6.10	9	6.30	7.20	7.90	6.70	7.80	8.30	....	....	....	....	.....	.....
6	4.30	4.70	$3.90	6.10	10	7.00	8.10	8.70	7.50	8.70	9.40	7.40	8.50	9.10	9.10	10.10	10.70
7	5.40	5.60	....	7.00	12	9.70	11.00	12.10	10.70	12.30	13.50	10.20	11.50	12.80	11.80	13.00	13.90
8	6.60	6.70	5.30	7.50	14	13.30	15.30	16.70	15.00	17.00	18.20	13.90	16.10	17.50	15.50	17.00	18.30
10	....	9.70	....	....	16	17.80	20.10	22.30	20.10	22.80	24.20	18.70	21.20	23.30	20.60	22.50	24.20
12	....	....	....	...	18	23.90	26.80	29.20	26.80	29.90	31.50	25.10	28.20	30.40	27.50	29.90	32.00
..	....	....	....	....	20	31.50	.....	.....	35.10	.....	.....	32.80	.....	.....	.....	.....	.....

Size In.	Half Round Bast.	Half Round 2d Cut	Half Round Smooth	Round Bast.	Round 2d Cut	Round Smooth	Warding Bast.	Warding 2d Cut	Warding Smooth	Knife Bast.	Knife 2d Cut	Knife Smooth	Pillar Bast.	Pillar 2d Cut	Pillar Smooth	Sq. Blunt Bast.	Rd. Blunt Bast.
4	$4.80	$5.60	$6.10	$3.00	$3.50	$3.90	$4.00	$4.80	$5.40	$5.40	$6.10	$6.40	....	....	....	....	....
5	5.40	6.10	6.40	3.20	3.80	4.10	4.50	5.30	5.80	6.10	6.70	7.10	....	....	....	....	....
6	6.10	6.70	7.10	3.50	4.00	4.50	4.90	5.90	6.40	6.90	7.50	7.90	$4.30	$5.10	$5.60	....	....
7	7.00	7.70	8.20	3.90	4.60	4.90	....	....	....	....	....	....	....	....	....	....	....
8	7.50	8.30	8.90	4.30	4.90	5.40	6.40	7.50	8.20	8.50	9.10	9.50	5.40	6.30	6.70	$7.40	$5.60
9	....	.....	.....	4.90	5.80	6.30	....	.....	.....	.....	.....	.....	....	....	....	....	....
10	9.10	10.10	10.70	5.60	6.40	7.00	8.70	10.10	11.00	10.10	11.50	12.30	7.50	8.70	9.40	10.20	7.50
12	11.80	13.00	13.90	7.50	8.60	9.40	.....	.....	.....	13.70	15.20	16.10	10.70	12.30	13.50	13.90	10.70
14	15.50	17.00	18.30	10.70	12.20	13.10	.....	.....	.....	.....	.....	.....	15.00	.....	.....	18.70	14.70
16	20.60	22.50	24.20	14.70	16.80	17.90	.....	.....	.....	.....	.....	.....	20.10	.....	.....	25.10	.....
18	27.50	29.90	32.00	20.20	22.70	24.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	32.80	.....
20	.....	.....	.....	27.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Size In.	Lead Float and Wood Files Flat	Lead Float and Wood Files Hlf. Rd.	Cabinet Files	Cabinet Rasps 2d Cut	Cabinet Rasps Smooth	Half Rd. Wood Rasps Bast.	Half Rd. Wood Rasps Smooth	Flat Wood Rasps Bast.	Flat Wood Rasps Smooth	Hand Finishing 2nd Cut	Hand Finishing Smooth	Size In.	Handsaw Blunt Slim	Double Ender	Cant Saw
6	$4.80	$7.00	$8.10	$10.10	$11.70	$8.10	$10.10	....	.....	.....	.....	4	$2.50	....	....
8	6.30	8.50	10.10	12.80	15.50	10.10	13.70	$9.40	$12.80	.....	.....	5	3.10	....	$4.70
10	8.60	10.70	13.70	17.50	20.70	13.70	18.70	12.80	17.50	.....	.....	6	3.80	....	5.40
12	11.80	14.10	18.70	22.80	26.80	18.70	24.80	17.50	23.20	$15.20	$16.20	7	....	$3.50	6.10
14	16.00	18.50	24.80	29.60	33.90	24.80	32.90	23.20	30.80	20.60	21.70	8	5.40	3.90	6.40
16	21.50	24.70	.....	.....	.....	32.90	43.60	30.80	40.90	.....	.....	9	....	4.40	....
..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	....	4.90	8.70
..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	....	12	....	6.00	11.40

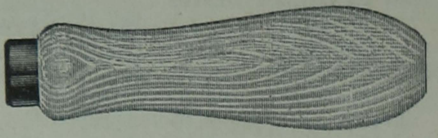
Size In.	Shoe Rasps Flat	Shoe Rasps Hf. Rd.	Planer Knife	Cross Cut	Special Cross Cut	Size In.	Horse Rasps Plain ½ File	Horse Rasps Plain Slim ½ File	Horse Rasps, Tanged Regular	Horse Rasps, Tanged Slim	Horse Rasps, Tanged Thin
6	.....	.....	....	$6.10	$3.90	12	$12.80	....	$16.80	....	1.531″x .270″ $16.00
7	.....	.....	....	....	4.30	13	.....	....	19.60	....	1.594″x .275″ 18.20
8	$10.10	$10.10	$6.40	7.50	4.90	14	17.80	....	23.10	13″ Stk. $21.90	1.750″x .280″ 21.90
9	12.20	12.20	....	8.50	....	15	20.90	....	27.30	13″ Stk. 25.20	1.812″x .285″ 25.20
10	13.70	13.70	8.60	9.10	6.70	16	24.40	14″ Stk. $21.50	32.20	14″ Stk. 29.70	1.875″x .290″ 29.70
12	.....	.....	....	11.80	....	18	32.90	15″ Stk. 25.90	.....	....	....
..	.....	.....	....	.....	....	20	.....	16″ Stk. 32.90	.....	....	....

Special Files

Size In.	Item	Price	Size In.	Item	Price
12	Flat Aluminum Files, No. 75	$11.80	10	Last Makers' Cabinet Rasps, Bastard	$17.60
14	Flat Aluminum Files, No. 76	16.00	10	Last Makers' Cabinet Rasps, 2d Cut	21.00
12	Hand Brass Files, No. 162	15.00	10	Pattern Makers' Cabinet Rasps, Bastard	16.50
12	Flat Armory Cut Files, No. 204	13.30	10	Pattern Makers' Cabinet Rasps, 2d Cut	18.00

The above list comprises all of the kinds, sizes and cuts of files that will be regularly carried in stock. Anything differing from these files will be considered as special and will not be manufactured except in case of urgent necessity and when manufactured price will be based strictly upon cost of material and cost of manufacture at time goods are made.

File Handles



Made from hard or soft wood, wax polish finished, and complete with polished seamless ferrules; bored, ready to receive tool. Packed 36 in cardboard boxes.

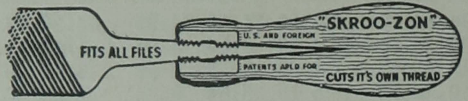
No.	Lgth. In.	Diam. In.	Price per Gross	No.	Lgth. In.	Diam. In.	Price per Gross
72	5	1½	**$7.35**	**75**	4¼	1⅛	**$5.45**
73	4¾	1⅜	**6.75**	**76**	4	1	**5.10**
74	4½	1¼	**6.10**	..	...	...	....

Above handles also put in assortment as follows:

Price, No. **630**, Assorted Regular, Containing Equal Quantities, Nos. 73, 74, 75 and 76........per gross **$6.10**

Price, No. **631**, Assorted Large, Containing Equal Quantities, Nos. 72, 73, 74 and 75........per gross **6.75**

Skroo-Zon File Handles

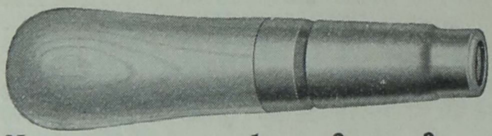


This is for use on files and all tools with a taper tang. Screws handle tightly on file, cutting its own thread. Made in eight sizes, each to be used on a certain file.

Made of moisture absorbing hardwood, shaped to fit the hand. Tang is held firmly in the hollow bore of the handle and never engages the wood, which, being relieved of all strain, cannot split. Packed 12 in a box.

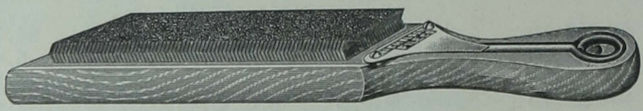
No.	For Files	Price per Dozen	No.	For Files	Price per Dozen
1	Special Small	**$1.20**	5	8-inch	**$2.40**
2	4-inch	**1.20**	6	10-inch	**2.40**
3	5-inch	**1.80**	7	12-inch	**3.00**
4	6-inch	**1.80**	8	14-inch	**3.00**

Lutz File Handles



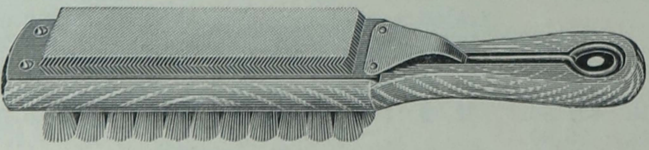
No.	1	2	3	4	5
Per Dozen.......	**$.90**	**1.00**	**1.20**	**1.40**	**1.60**
Length........in.	4	4½	4⅞	5½	5⅞
Diameter.....in.	1	1³⁄₁₆	1⁵⁄₁₆	1⁷⁄₁₆	1⁹⁄₁₆
For Files......in.	3 to 6	6 to 8	8 to 12	12 to 16	16 to 20

File Cards



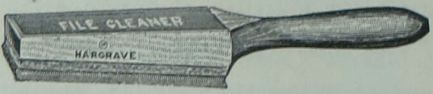
With Scorer..................................per dozen .....

File Cards and Brushes



With Scorer...............................per dozen .....

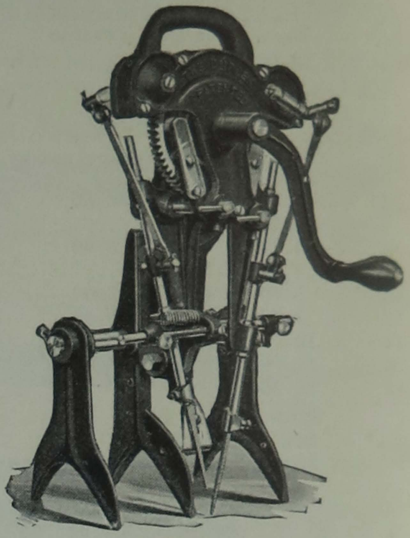
No. 364 Hargrave File Cleaners



Has tempered steel wire teeth which will not turn over by coming in contact with file. Has heavy hardwood handle.

Price, No. **364** ....each **$.50**

Duplex Gin Saw Filers



The Duplex Gin Saw Filer is intended to do fine work, and adjustments are provided to meet every condition. Any required kind of sharpening can be readily done, either merely sharpening the teeth when they are long enough, but dull, or deepening and lengthening the teeth in addition to sharpening them, if desired.

No mechanical training is required to operate it. Adjustments, while sufficient to guarantee perfect work, are plain and simple, and the machine does its work with precision and exactness that are almost human, automatically feeding from tooth to tooth without attention from the operator.

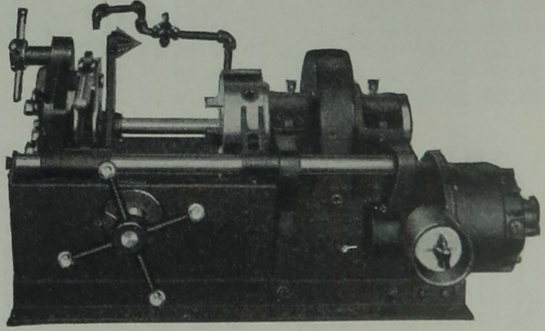
Parts are accurately made and well finished, and the machine will last a lifetime. All gears are cut, not cast, and wearing parts are hardened. File pressure is adjustable, and files work on both sides of the saw at once. Has independent feed and may be used on 10, 12 or 12½-inch saws.

Shipping weight, 40 pounds.

Price...each **$50.00**
" Extra Files........................per dozen **1.50**

No. 999 Toledo Portable Pipe Machines

Capacity, ½ to 2-Inch Pipe, Inclusive



An efficient, small, compact, portable ½ to 2-inch power pipe machine. The ½-h.p. ball bearing universal motor operates from any 110-volt lamp socket. Other motors, quotation on request.

Can be furnished in any one of 3 ways as listed below and complete with ½ to 2-inch right hand dies, bushings, complete set of 4 cutter blades, chuck wrench, cutter blade wrench, friction gear wrench, 10 feet of cable with connectors and 1 gallon of thread cutting oil.

Standard model same as super model except has non-opening die heads and dies. Either machine can be furnished with steel stand either open or enclosed type and with or without 16-inch rubber-tired or steel-tired wheels. Either machine can also be furnished with ⅛, ¼ or ⅜-inch sizes if desired.

No. **999**, Standard Model, Complete with 6 Non-Opening Die Heads with ½ to 2-Inch Right Hand Dies, Shipping Weight 425 Pounds..........each **$285.00**

No. **999**, Super Model, Complete with 3 Quick-Opening Die Heads, Complete Set of ½ to 2-Inch Dies for Same, Shipping Weight 427 Pounds.......each **320.30**

No. **999**, Super Model, Complete with 6 Quick-Opening Die Heads and Complete Set of ½ to 2-Inch Dies for Same, Shipping Weight 445 Pounds.each **350.00**

Toledo Universal Drive Shafts

Especially designed to operate geared threading and cutting tools with power pipe machines. One end of the shaft is held in the chuck of the pipe machine and the socket is slipped over the driving pinion of the threading or cutting tool.

Shaft is extra long, measuring 20 inches, which permits inserting through spindle of No. 999 Toledo Machine and operating tools from rear of machine.

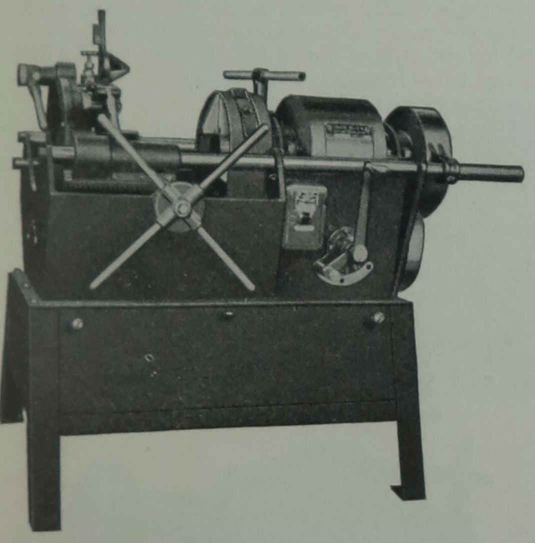
Socket is fitted with set screw and adjustable for large or small driving pinions of the pipe tools.

Overall length, 64½ inches. Shipping weight, 42 pounds.

Each **$20.00**

Toledo High-Speed Power Pipe Machines

Capacity, 2-Inch High-Speed—½ to 2-Inch Pipe
Capacity, No. 1-2-4—1 to 4-Inch Pipe



Dies changed instantly; large pipe cut and threaded as easily as small.

Cutter head with 4 double-edged high-speed steel knives. No. 1-2-4 cuts off 4-inch pipe in 9 seconds; 2-inch High-Speed cuts off 2-inch pipe in 6 seconds. Separate adjustable quick-opening die head for each size. Six spindle speeds. Gears and friction clutch run in oil.

Bolt dies up to 2-inch can be furnished.

Chuck wrench ejector fingers positively remove wrench from chuck. Centrifugal oil pump. Short nipples cut without nipple chucks.

Cone type single blade reamer is instantly swung into position and fed by carriage hand wheel. Blade may be removed and easily reground or replaced.

Machines are furnished complete with separate quick-opening die head for each size of pipe within their capacities, and high-speed steel dies; cutter knives; reamer; wrenches; adjustable pipe support; and cutting oil.

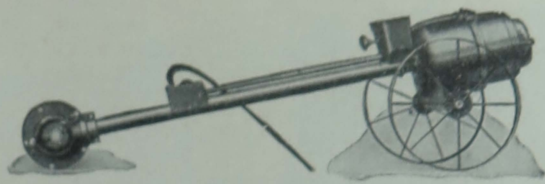
Weight: 2-inch High Speed, net 850 pounds, shipping 1110 pounds; No. 1-2-4, net 1750 pounds, shipping 2000 pounds.

2-Inch High-Speed Model, Complete ½ to 2-Inch Power Pipe Machine with A. C. 60-Cycle, 3-Phase, 220-440-Volt Motor..................each	**$750.00**
No. 1-2-4 Model, Complete 1 to 4-inch Power Pipe Machine with A. C. 60, 50 or 40-Cycle, 3-Phase, 220-440-Volt Motor........................each	**1400.00**

Motors of other current specifications can be furnished; prices quoted on request.

Toledo Power Drives

Standard Drives



Designed to operate Toledo hand threading and cutting devices by electricity, threading and cutting pipe from 2 to 12 inches. Also used to turn sheet metal rolls, operate hoisting winches to pull electric cable thru conduit and many other machines requiring hand cranking methods of operation.

Light, portable, strong and easy to operate. Consists of a specially designed electric motor, mounted in a housing which also encloses a transmission gearing. A driving shaft extends to the operating end of the shaft housing, the whole mechanism being mounted on iron wheels.

Motors can be supplied for A.C. 1½ H.P. or for D.C. 1 H.P. Equipped with twenty feet of flexible cable. Length of drive, approximately 6 feet; net weight, from 230 to 273 pounds. Wheels, 18 inches in diameter. Driving head is furnished with two driving bushings to fit the two sizes of pinions used on the various Toledo tools. At slow speed it rotates at 38 R.P.M. and on high speed, 57 R.P.M.

Drives can be supplied from factory stock equipped with 60 cycle, single phase, A.C. motors for 220 or 110 volts and with 220 or 110 volt D.C. Motors.

Drives also furnished with three phase motors, or for higher voltages or different cycles, prices upon application.

Type Motor	Each	Ship. Wt. Lbs.
With A.C. Motor, 60 or 50 cycle, S.P..........	**$300.00**	328
With A.C. Motor, 40, 30 or 25 Cycle, S.P.....	**350.00**	350
With D.C. Motor.............................	**300.00**	370
Special Attachment for No. 1 tool............	**2.50**	6

When ordering, always specify voltage.

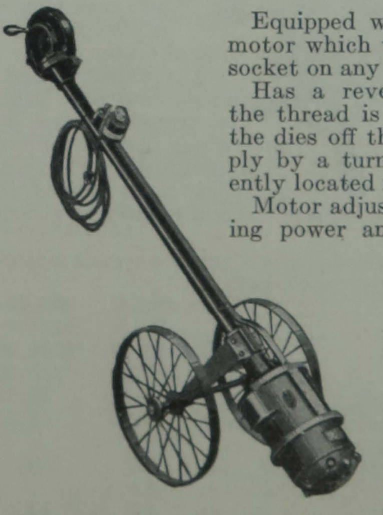
Super Power Drive

Similar in appearance to the Standard drive but larger.

Furnished with 2½ H.P. 3-phase A.C. motor only, either 220 or 440 volts. Controlled by a specially designed switch conveniently located on the drive shaft casing. Driving head rotates at 57 R.P.M. low speed and 97 R.P.M. high speed. Net weight, 278 pounds.

Super Power Drive, Shipping Wt., 396 Lbs.....each **$375.00**

Universal Power Drives



Equipped with a ½ H.P. universal motor which will operate from a light socket on any 110 volt current.

Has a reversible motor and after the thread is cut, the operator backs the dies off the completed thread simply by a turn of the switch conveniently located near the driving head.

Motor adjusts speed to load increasing power and decreasing speed on heavy loads. Thus it backs the dies off rapidly and without loss of time, and always assures maximum efficiency.

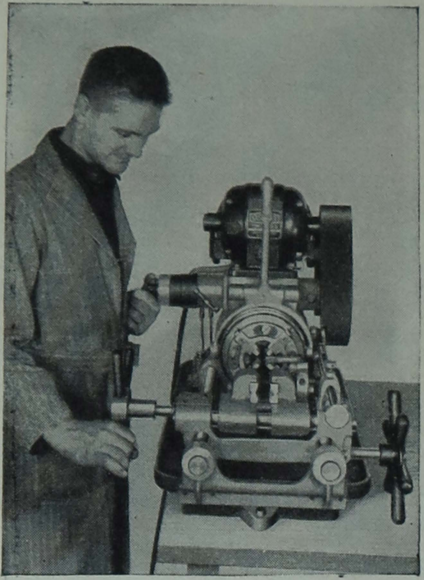
Weight 165 pounds.

Strongly built, simple in construction, easy to operate. Will operate Toledo tools for cutting and threading pipe up to and including 12-inch. Efficient in opening or closing large gate valves and will reduce operating time to a fraction of hand operation. A special adjustable safety device can also be furnished for valve operation. Price on application.

Universal Drive, Shipping Weight, 242 Lbs....each **$250.00**

No. 521 Tom Thumb Electric Driven Pipe and Bolt Machines

Rotary Die-Head Type



Can be furnished as a bolt machine or with special equipment to handle close and shoulder nipples. Capacity, pipe, ½ to 1¼ inches; bolts, ⅜ to 1¼ in.

Shortest length pipe threaded in regular head without nipple chucks, 2½ inches; shortest distance from bolt head to which thread can be cut using standard head and chuck 7/16 in.

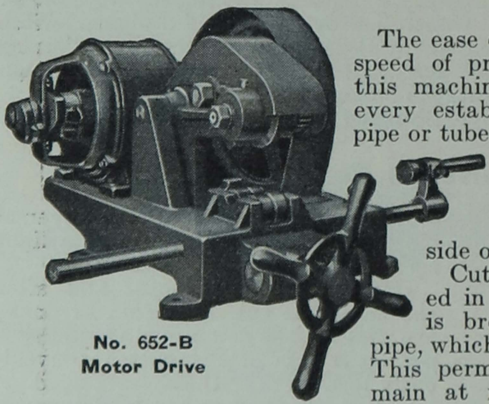
With self-opening adjustable die head, open type vise, oil pump and base containing oil reservoir; universal, reversible variable speed motor of standard voltage. Shipping weight complete 370 pounds.

No. **521**, Complete without Any Dies	each	**$315.00**
Pipe Dies, 1 Set Each ¼ and ⅜, ½ and ¾, 1 and 1¼ Inches, Carbon Steel	per set	**2.25**
Pipe Dies, 1 Set ⅛ Inch, Carbon Steel	per set	**4.50**
Bolt Dies, R.H., U.S.S. (N.C.) Any Size from ¼ to 1¼ In. (Pitch Limit 6) 1 Set to a Size, Carbon Steel	per set	**3.38**
Bolt Dies, Same as Above, But R.H., S.A.E. (N.F.)	per set	**4.50**
Pipe or Bolt Dies, High Speed Steel	per set	**6.00**
Pipe or Bolt Dies, N.F., S.A.E., R.H., High Speed Steel	per set	**7.50**

No. 652 Oster Cutting-Off Machines

Belt or Motor Driven

Capacity, ¼ to 2 Inches



No. 652-B
Motor Drive

The ease of operation and speed of production, make this machine desirable for every establishment where pipe or tubes are cut off.

Length gauge can be set to cut off any length of pipe on either side of cutter disc.

Cutter disc, mounted in a movable arm, is brought down on pipe, which rests on rollers. This permits pipe to remain at right angles to cutter disc, insuring clean, square cut and greatly lengthening life of cutter disc.

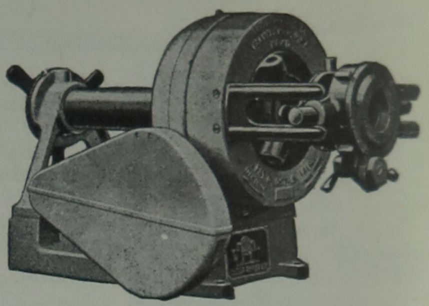
A welded stand can be furnished with either belt or motor-driven machine, at a slight extra cost.

No		**652-A**	**652-B**
Style Drive		Belt	Motor
With Hand Feed	each	**$150.00**	***$225.00**
With Food Feed	each	**250.00**	***325.00**
Price, Welded Steel Stand	each	**28.12**	**28.12**
Price, Extra Cutter Discs	each	**5.25**	**5.25**
H.P. Engine or Motor		1	1
Speed of Countershaft or Motor	r.p.m.	250	1800
Diameter of Belt Pulley	inches	12	..
Total Height	inches	17	17
Total Length	inches	26	29
Total Width	inches	18	22
Shipping Weight, Machine	pounds	235	335
Shipping Weight, Steel Stand	pounds	95	95

*Complete with motor and controls.

No. 412 Oster Power Boy Electric Drive

For Pipe Tools



In the shop or on the job the Oster Power Boy is always ready to thread cut-off, and make up fittings on all sizes of pipe from ½ to 2 inches, inclusive. It also handles the larger sizes of pipe up to 4 inches by means of a drive shaft.

Its aluminum alloy frame, brings its weight down to only 152 pounds and makes it easy to carry from job to job.

The Power Boy can be run from any ordinary electric current. The machine is furnished complete, less the die stock. Although the Oster Bull-Dog Die Stock is recommended for use with the Power Boy, nearly any tcol can be used.

The ½-H.P. universal motor furnished with the Oster Power Boy can be run from any 110 or 115-volt circuit, either d.c. or a.c. of from 25 to 60 cycles, single phase. This motor automatically speeds up on the smaller sizes of pipe and holds the necessary speed on the larger sizes.

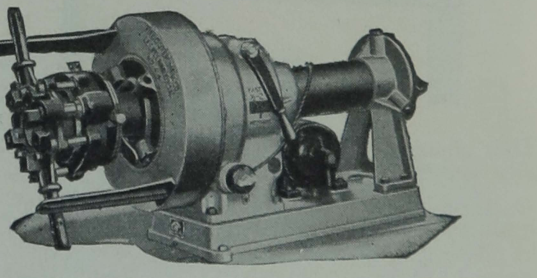
Total height of machine is 18⅛ inches, total width is 14½ inches and total length is 30 1/16 inches.

Shipping weight is 200 pounds.

Price, No. **412**, Machine Complete with Universal, Variable Speed, Reversible Motor, 10 Feet of Electric Light Cord and Socket Connection, Capable of Driving Pipe Tools from ½ to 2-Inch Capacity, but Less Die Stock	each	....
Price, No. **114** Bull-Dog Die Stock, Capacity ½ to 2 Inches, Extra	each	....
Price, Universal Drive Shaft for Die Stock up to 4-inch Capacity, Extra	each	....
Price, All Metal Stand, Extra	each	....

No. 414 Oster Power Boy Electric Drives

For Pipe Sizes ½ to 4 Inches



Driving No. 44 Geared Die-Stock on 4-Inch Pipe

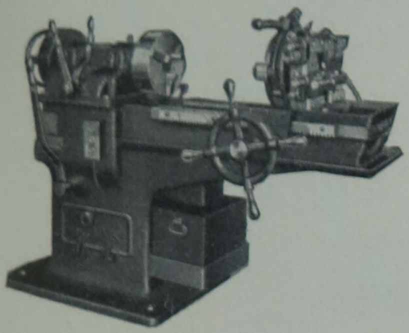
A portable heavy duty pipe threader, of aluminum alloy. Can be run from ordinary light socket. A 2-speed gear shift added to variable speeds of motor gives necessary power.

By means of special drive shaft will operate geared die-stocks from 4½ to 12 inches in capaity.

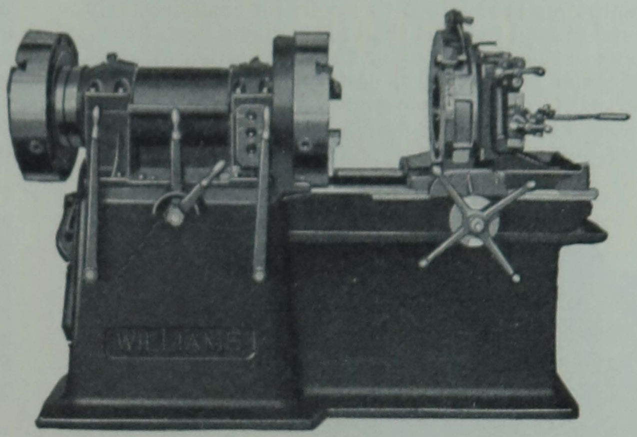
Over all height, 24¾ inches; width, 20 inches; length, 47 inches. Shipping weight, 565 pounds.

No. **414**, Complete with Universal, Reversible, Variable Speed Motor for 115 Volts D.C. and 110 Volts, 25–60 Cycles, Single-Phase A.C. with 10-Foot Electric Cord, Reversing Snap Switch and Socket Connection, without Die Stock	each	......
No. **114**, Bull-Dog Stock and Dies Complete with Short Handles and Complete Set Consisting of 3 Individual Sets of Right-Hand Pipe Dies from ½ to 2 Inches, Inclusive	each	......
No. **44**, Geared Die Stock and Dies Complete with Short Handles and Complete Set Consisting of 4 Individual Sets of Right-Hand Pipe Dies from 2½ to 4 Inches, Inclusive	each	......
Auxiliary Drive Shaft for Driving 4½ to 12-Inch Geared Die Stocks	each	......
All Metal Lift-Wheel Type Stand	each	......
Reamer and Holder Complete, Cap. ½ to 2 In	each	......
Reamer and Holder Complete, Cap. 2¼ to 4 In	each	......

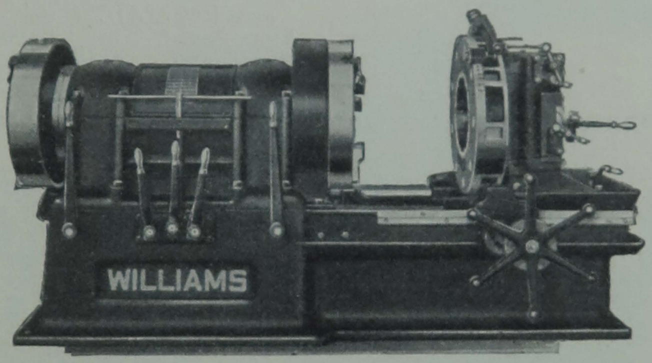
Williams Rapiduction Pipe Threading Machines



No. 2



No. 6



No. 12

The Williams Rapiduction Pipe Threading and Cutting Machine is designed especially for high production service, having several unique features which have made it the outstanding tool for this class of threading.

The Rapiduction has a patented die-head that handles all sizes of pipe within the range of the machine. No change of die-head is needed—and no change of dies, except when the pitch of the thread changes.

High-speed tool steel dies are used—small and inexpensive. An entire set of dies for the 12-inch Rapiduction weighs only 8 pounds, as compared to the 144 pounds of dies for a 12-inch threading machine of ordinary type. The saving in expensive tool steel is evident.

To give maximum speed in the threading and cutting of all sizes of pipe within range of the machine, a wide range of spindle speeds are provided. Three conveniently placed levers control the speed changes.

The Rapiduction Machine is fitted with rear chuck and reversing mechanism for tightening up or backing off flanges or fittings. A dual control lever is placed at both front and rear chucks convenient to the operator at all times.

All hardened steel gears are used in the head stock, together with bronze bushings, and are continually running in oil.

These machines can be furnished, arranged for either single pulley belt drive, or silent chain motor drive. On all motor-driven machines the motor is mounted in the base of the machine.

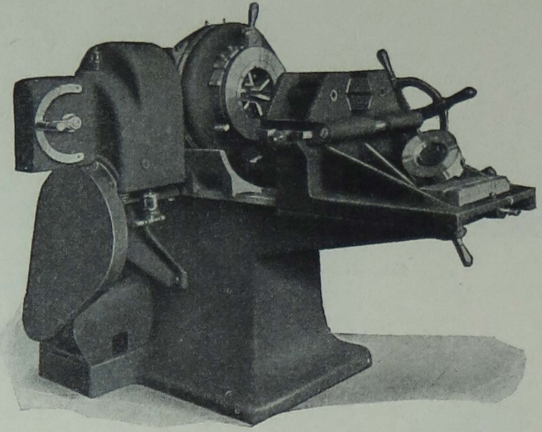
No.		2	4	6-A	8	12	16
Pipe Capacity	inches	¼ to 2	1 to 4	1½ to 6	2½ to 8	3½ to 12	6 to 16
Extra Capacity (Pipe)	inches	⅛	½ and ¾	....	1½ and 2	2½ and 3	5
Bolt Capacity	inches	½ to 1½	¾ to 3	1 to 4	....	....	......
Spindle Speeds		7	6	6	6	8	8
Head Traverse	inches	24	28	28	28	30	30
No. of Dies (per Set)		4	5	5	7	9	11
Size Motor (1200 R.P.M.)	h. p.	2	5	5	7½	10	15
Floor Space	feet	5¼x2	3½x6½	4⅙x7⅚	4⅙x7⅚	4 7/12x10¼	11 1/12x5
Net Weight	pounds	1950	4250	6850	7000	12500	18500
Shipping Weight, Crated	pounds	2350	4600	7350	7500	13300	19500

Prices and special bulletin upon application.

No. 300 Series Oster General Purpose Threading Machines

Constructed with revolving die-head, the pipe remaining stationary as it is being threaded. Low in power consumption, as less power is required to revolve a comparatively light die head around the pipe than to revolve a long, heavy length of pipe in the dies. Long or short and either straight or bent pieces of pipe, nipples, casings, rods or bolts can be handled with ease. The extreme versatility of these machines makes them ideally suited to the requirements of nearly every kind of business.

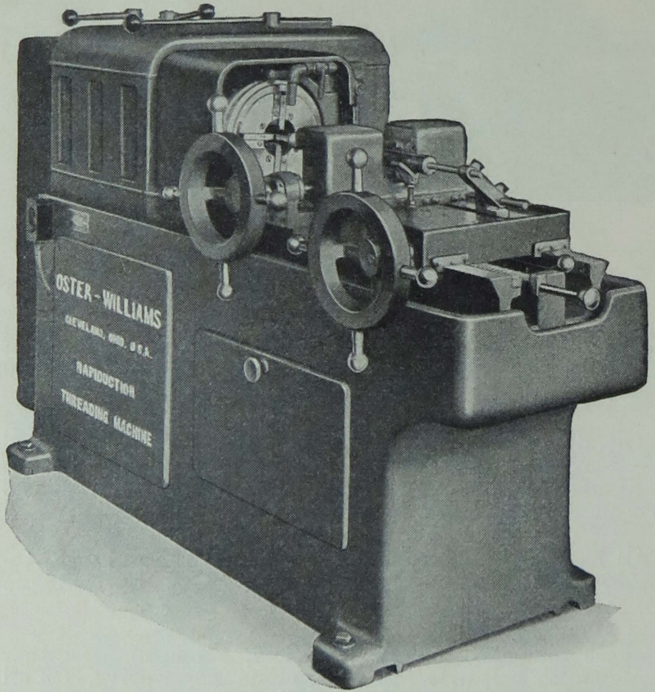
Furnished complete with cone pulley and countershaft or motor of standard voltage and suitable control, geared oil pump and fountain flood oiling system, automatic die release (except No. 308), automatic cut-off apparatus, adjustable pipe rest stand (except No. 302), die bushing, full set of wrenches and one complete set of dies covering range of machine. Dies are lever operated and controlled and easily adjusted for standard, over or under-size threads. Lever opens dies, and closes them to cut exactly the same.



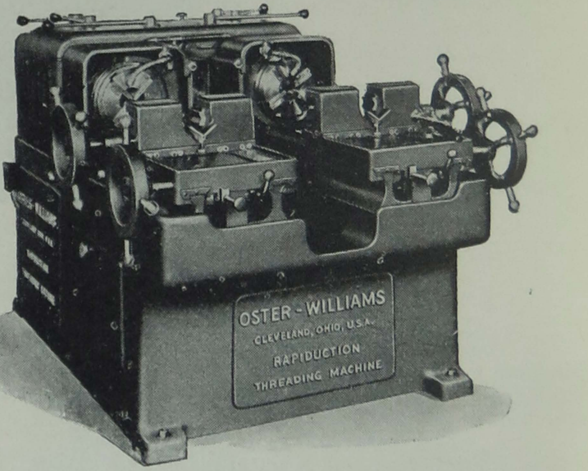
Specifications

No.	302	304	316	308
Regular Pipe Cap.....in.	¼ to 2	1 to 4	1¼ to 6	2½ to 8
Extra Pipe Cap. in.	⅛	½ & ¾	1	1½ & 2
Bolt Capacity..in.	½ to 1¼	¾ to 1⅝	1 to 2	1½ to 3
No. Dies per Set..	4	4	6	6
Die Head Speeds (R.P.M.)	9–19	8–15	2.5–4.5–9	2–3–4
Maximum Vise Travel.in.	6¾	7	9¼	10¾
Shortest Length from Bend That Can Be Held in Vise.in.	5⅝	10	11	18
Shortest Length of Pipe Threaded without Use of Nipple Jaws..in.	3½	4½	5½	25
Size Motor Required (1800 R.P.M.)..	¾	1½	1½	3
Floor Space.....in.	36x29	42x37	54x49	90x70
Approx. Wt.....lbs.	800	1350	2000	3900

No. 900 Series Oster-Williams Single and Double Spindle Rapiduction Threading Machines



Single Head



Double Head

Bed, gear case, etc., are of high tensile strength, cast iron of generous section to give needed weight and rigidity.

All shafts are heat-treated and run in Timken Bearings. All gears are chrome-nickel steel, heat-treated and hardened, and run in oil. There are 8 spindle speeds in accurate geometric ratio, to each head independently. A mechanical reverse to one spindle permits right and left-hand threads to be cut simultaneously. Spindles are high carbon steel forgings, mounted in pre-loaded Timken Bearings.

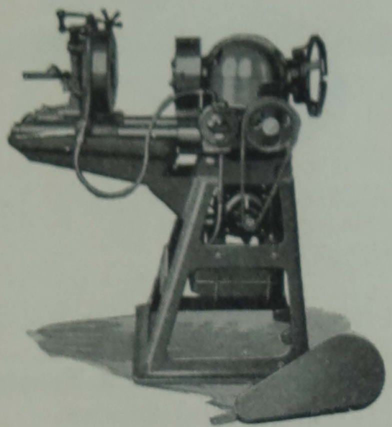
Die heads are of high carbon steel and all parts are hardened and ground. Protected lead screws run in large, preloaded, anti-friction bearings, to prevent end play; entire range of pitches is obtained by changing only one gear. Left-hand operation is possible. A third half nut is provided to take up back lash.

Carriages are heavily constructed and taper gibbed on outside of bed ways; this gives maximum width and accessibility for gib adjustment. Carriage tops are free for attachment of special fixtures and for handling of stock.

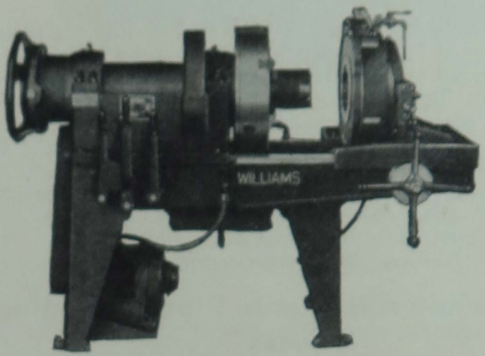
Specifications

No.	915	915	922	922
Head	Single	Double	Single	Double
Bolt Capacity..in.	⅜ to 1½	⅜ to 1½	½ to 2¼	½ to 2¼
Spindle Speeds....	8	8	8	8
Motor Required h.p.	3	5	5	7½
Motor Required.....r.p.m.	1800	1800	1200	1200
Length Thread Cut One Setting...in.	18	18	18	18
Length Ways...in.	34	34	34	34
Diam. Hole in Spindle.......in.	2⅛	2⅛	3¼	3¼
Width Vise Jaws in.	2 13/16	2 13/16	2 13/16	2 13/16
Length Each Jaw Slide.........in.	5¾	5¾	5¾	5¾
Width across Carriage Gibs....in.	11⅞	11⅞	11⅞	11⅞
Length Carriage in.	16	16	16	16
Distance between Vise Jaws (Open)..in.	3¼	3¼	3¼	3¼
Standard Swing.in.	13	13	13	13
Length over All.in.	84	84	84	84
Width over All.in.	40	55½	40	55½
Height over All.in.	48	48	48	48
Weight........lbs.	4400	5850	4500	6000

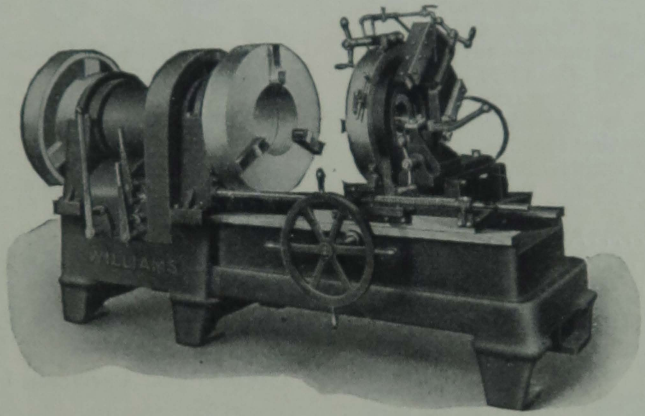
Williams Standard, Wilco and Willie Williams Portable Pipe Threading Machines



Willie Williams Portable
Capacity ½ to 2 Inches



Nos. 704 and 706
The Wilco Line



Nos. 8-B and 12-B, Standard Line

A pipe threader that embodies many short-cuts which produce perfect threads at a lower cost. Powerful, sturdily built, simple and trouble-proof. Operates with little upkeep.

The low cost of operation, and the low initial cost, make the Williams Standard a most attractive investment for the plant that has not enough work to keep a threading machine running on continuous production.

Equipped with the Williams standard die-head in which the dies are readily adjustable to all variations of fittings, the die-head being graduated so that it is unnecessary to use blank gauges. By opening the swinging door of the die-head, dies can be taken out and others slipped in.

Wide range of spindle speeds. The operator therefore is able to use the best speed for each particular job. He can get any speed needed with just two levers, controlled from his regular position. Considerable time is saved in changing pipe, as the spindle can be stopped, and the pipe changed without stopping the driving gears.

These machines can be furnished arranged for either single pulley belt drive or direct connected motor drive.

	Willie Williams Portable	Wilco		Wilco For A. P. I. Threads		Standard	
No.	Pedestal	**704**	**706**	**704** O.F.	**706** O.F.	8-B	12-B
Capacity . . . in.	¼ to 2	1 to 4	1 to 6	1 to 4	1 to 6	2½ to 8	3½ to 12
Extra Pipe Capacity . . . in.	⅛	½ and ¾	. . . . . .	½ and ¾	. . . . . .	1½ and 2	2½ and 3
Bolt Capacity . . . in.	. . . . . .	¾ to 3	1 to 4	¾ to 3	1 to 4	. . . . . .	. . . . . .
A.P.I. Casing or Tubing Cap., Max . . . in.	. . . . . .	. . . . . .	. . . . . .	4¾	6⅝	8⅝	13⅝
Spindle Speeds . . . r.p.m.	Variable	4	4	4	4	8	8
Head Traverse . . . in.	12	22	22	22	22	28	30½
No. Dies per Set	4	5	5	5	5	8	12
No. Sets of Dies to Cover Range	4	2	2	2	2	5	6
Size Motor . . . h.p.	½	3	5	5	7½	5	5
Floor Space	3′3″x2′4″	7′0″x3′0″	7′0″x3′0″	7′0″x8′0″	7′0″x3′0″	8′0″x3′6″	10′0″x4′0″
Approximate Net Weight . . . lbs.	540	2750	3100	2825	3175	5500	7775

Prices and Special Bulletin Upon Application

Toledo 3-Way Pipe Threading Devices

A 3-way tool, light, small and easy to operate. It is made in two sizes, No. 30 and No. 31.

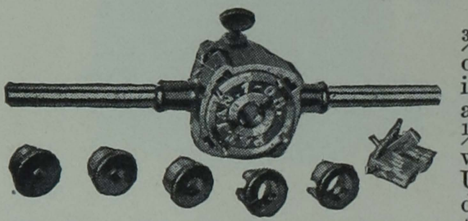
No. 30 threads ⅜, ½ and ¾ inch and weighs 4¾ pounds.

No. 31 threads ½, ¾ and 1 inch and weighs 7 pounds.

Each die head is on center thereby insuring a perfectly balanced tool. The dies are removable and can be reground when dull or replaced at a small expense.

No.	30	31
Shipping Weight....................pounds	5¾	8¼
Price, Complete......................each	$6.00	$6.75
Price, ⅜-Inch Dies, per Set of 4 Segments...	1.30	....
Price, ½, ¾-Inch Dies, per Set of 4 Segments	1.30	1.30
Price, 1-Inch Dies, per Set of 4 Segments....	....	1.63

No. 0 Toledo Adjustable Pipe Threading Devices

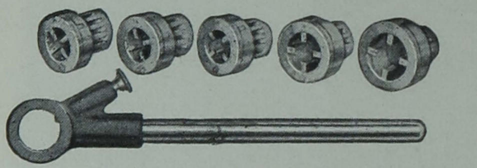


Threads ½ and ¾-inch with one set of dies; ¼ and ⅜-inch threads with another set, and ⅛-inch threads with another set. Uses the receding-die principle for threading ½ and ¾-inch pipe, making it an easy operating tool.

Light and compact, being only 24 inches long from tip to tip of the handles.

No. of Sets of Dies to Stock......................		3
No. 0, Complete..................................	each	$10.40
Dies per Set of Four Segments....................		1.38

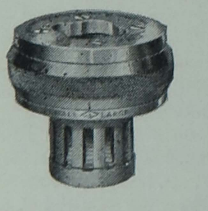
No. 00 Toledo Ratchet Pipe Threading Devices



Die heads are changed by pulling ratchet pawl knob. Complete tool consists of ratchet handle, ⅛, ¼, ⅜, ½ and ¾-inch die heads with right hand dies; packed in a carton.

No. 00 Comp., ⅛ to ¾″ Incl., Ship. Wt. 10 lbs..	each	$12.35
Ratchet Only.................................	each	1.95
⅛, ¼ or ⅜-Inch Die Head with Pipe Dies.....	each	1.95
½ or ¾-Inch Die Head with Pipe Dies.........	each	2.28
Dies, per Set of 4 Segments....................		1.30
⅜ to 9/16″ Adjustable Bolt Die Heads with U.S.S. or S.A.E. Right Hand Bolt Dies................	each	3.35
⅝ to 1″ Adjustable Bolt Die Heads with U.S.S. or S.A.E. Right Hand Bolt Dies................	each	3.50

Toledo Adjustable Bolt Die Heads

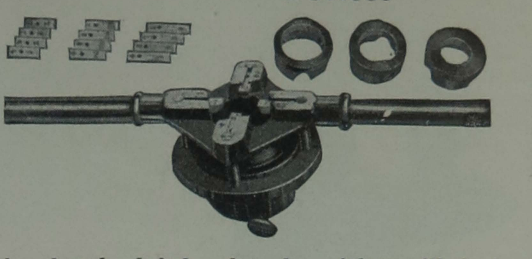


This adjustable bolt die head is designed for use in the regular No. 00 Toledo Ratchet Handle.

Standard bolt threads, or an over or under adjustment of 1/64 inch are obtained by loosening the four die head cover screws and turning the knurled ring until dies are set to desired size.

⅜, 7/16, ½ or 9/16-Inch Head with U.S.S. or S.A.E. R.H. Bolt Dies; Ship. Wt. 2½ Lbs...........	each	$3.35
⅜, 7/16, ½ or 9/16-Inch U.S.S. or S.A.E. Bolt Dies, Only; Ship. Wt. 4 Oz......................	per set	1.60
⅝, ¾, ⅞ or 1-Inch Head with U.S.S. or S.A.E. R.H. Bolt Dies; Ship. Wt. 2½ Lbs................	each	3.50
⅝, ¾, ⅞ or 1-Inch U.S.S. or S.A.E. Bolt Dies, Only; Ship. Wt. 4 Oz..........................	per set	1.75

No. 1 Toledo Adjustable Pipe Threading Devices



Threads 1, 1¼, 1½ and 2-inch pipe. With this device one man can easily cut 2-inch threads.

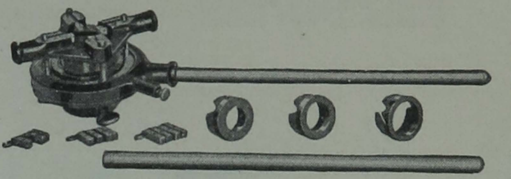
Made both as a right-hand and a left-hand tool—neither will do both.

Right-hand is furnished unless otherwise specified.

Left-hand is slightly higher in price.

No. of Sets of Dies to Stock......................		4
No. 1, Complete..................................	each	$9.00
1, 1¼ or 1½-Inch Dies, per Set of Four Segments...		.75
2-Inch Dies, per Set of Four Segments..............		1.25

No. 1A Toledo Adjustable Ratchet Pipe Threading Devices



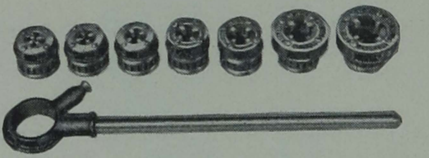
Threads 1, 1¼, 1½, and 2-inch pipe; equipped with a ratchet. The No. 1A may be used with two handles as an ordinary die stock, or with one handle inserted in the ratchet case. It is desirable for threading pipe down a trench, or against walls, between rafters, etc.

Right-hand is furnished unless otherwise specified.

No. of Sets of Dies to Stock......................		4
No. 1A, Complete..................................	each	$11.25
1, 1¼, or 1½-Inch Dies, per Set of Four Segments..		.75
2-Inch Dies, per Set of Four Segments..............		1.25

No. 11 Toledo Ratchet Pipe Threading Devices

Capacity ⅛ to 1¼-inch Pipe

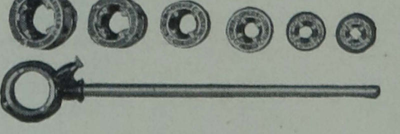


Complete tool consists of ratchet, r.h. die heads with dies in a carton.

Die heads instantly changed by pulling ratchet pawl knob. Die segments can be removed and reground.

No. 11, Complete, ½ to 1¼-Inch Size..........	each	$12.00
No. 11, Complete, ⅛ to 1-Inch Size............	each	17.00
No. 11, Complete, ⅛ to 1¼-Inch Size..........	each	19.50
Ratchet Only......................................	each	2.00
⅛, ¼, ⅜, ½, ¾, 1, 1¼-In. Die Head with Dies.	each	2.50
⅛, ¼, ⅜, ½ or ¾-In. Dies Only............	per set	1.30
1 or 1¼-Inch Dies Only......................	per set	1.63
Die Heads, U.S.S. Bolt Dies ½ to 1-In........	each	5.00

No. 12 Toledo Ratchet Pipe Threading Devices



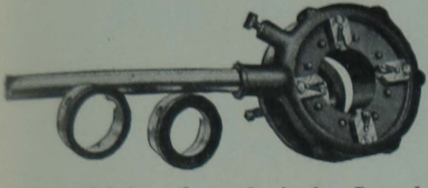
Die heads changed by pulling ratchet pawl knob.

Special dies can be furnished for threading electric conduit, brass, or copper pipe.

Complete tool consists of ratchet handle, ½, ¾, 1, 1¼, 1½ and 2-inch die heads with dies, packed in a strong carton.

No. 12, Complete, Shipping Weight 27 Pounds..	each	$21.00
Ratchet Only......................................	each	3.00
½, ⅜ or ¾-Inch Die Head with Dies..........	each	2.60
1 or 1¼-Inch Die Head with Dies.............	each	3.00
1½ or 2-Inch Die Head with Dies.............	each	3.40
½, ⅜ or ¾-Inch Dies..........................	per set	1.30
1 or 1¼-Inch Dies............................	per set	1.63
1½ or 2-Inch Dies............................	per set	2.15

No. 1½R Toledo Adjustable Ratchet Threading Devices

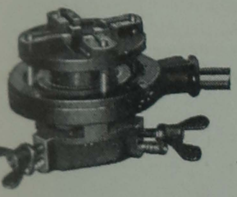


For threading 2½ to 3-inch pipe, 8 threads to the inch. Also made as a special tool for threading oil well tubing for 2, 2½ and 3-inch sizes, 11½ threads to the inch. In ordering, be sure to state whether the standard pipe thread tool or the special oil well tubing tool is desired.

No.	1½R	1½R
Complete....each	$27.00	$30.00
Dies per Set of Four Segments	2.40	2.40
No. Threads to the Inch	8	11½
No. of Sets of Dies to Stock	2	3
Shipping Weight....pounds	45	47

Toledo Adjustable Pipe Threading Devices

No Bushings

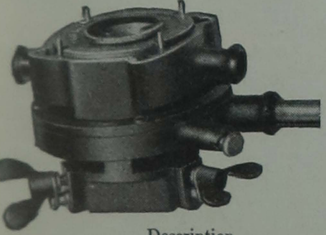


Capacity, 1 to 2-inch pipe, inclusive. Excellent for brass or copper as well as iron or steel pipe.

Complete tool consists of the tool body, 2 handles, complete set of 1 to 2-inch right-hand dies, and an instruction card, all packed in a carton. No. 1BR device furnished with only one handle.

No. 1B, Plain, Complete, Ship. Wt. 22 Lbs.....each	$12.00
No. 1BR, Ratchet, Complete, Ship. Wt. 24 Lbs..each	15.00
Complete Set of Right-Hand Dies....each	3.50
Set of 1, 1¼ or 1½-Inch Right-Hand Dies....each	.75
Set of 2-Inch Right-Hand Dies....each	1.25
Sgl. Set of 1, 1¼ or 1½-In. Dies for W.I. Pipe..each	1.00
Set of 2-Inch Dies for W. I. Pipe....each	1.50
Sgl. Set of 1, 1¼, 1½ or 2-In. Brass Pipe Dies....each	1.00

Toledo Adjustable Pipe Threading Devices



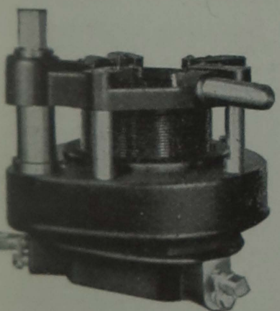
Adjustable self-contained 1 to 2-inch Ratchet.

A desirable oil field tool.

Consists of body, set of 1 to 2 inch right hand dies, handle, and instruction card, all packed in a wooden box.

Description	Each	Net Wt. Lbs.	Ship. Wt. Lbs.
No. 10 BR, Complete, 1 to 2 inch......	$12.92	26	34
No. 10B, As Above, Less Ratchet.....	10.64	19	27
1 Set R. H. Dies, 1 to 2 inch..........	2.75	11/16	1
1 Complete Set L. H. Dies...........	6.60	2¾	3
1 Set 1 inch L. H. Dies..............	1.65	¾	1
1 Set 1¼ inch L. H. Dies.............	1.65	11/16	1
1 Set 1½ inch L. H. Dies.............	1.65	⅝	1
1 Set 2 inch L. H. Dies..............	1.65	9/16	1

No. 2BR Toledo Geared Adjustable Threading Devices



Capacity 2½ to 4-inch pipe, inclusive. Equipped with a new type 3-jaw pipe holder. No bushings.

Complete tool consists of tool body; complete set of 2½ to 4-inch right-hand dies; set screw wrench and instruction card. Packed in wood box and ratchet handle shipped separately.

No. 2BR, Complete; Ship. Wt. 92 Lbs....each	$55.00
Comp. Set Dies, 2½ to 4-In.; Ship. Wt. 8 Lbs.each	16.00
Set 2½-Inch Dies; Ship. Wt. 3 Lbs....each	4.00
Set 3-Inch Dies; Ship. Wt. 3 Lbs....each	4.00
Set 3½-Inch Dies; Ship. Wt. 2 Lbs....each	4.00
Set 4-Inch Dies; Ship. Wt. 2 Lbs....each	4.00

Armstrong Bros. Adjustable Pipe Die Sets with Stocks

Cadmium Finish

Dies are made of special Vanadium tool steel with backed-off chasers. Each set consists of one stock complete with an assortment of dies and guides as listed. American Standard Briggs right hand dies will be sent unless otherwise specified. Drop forged wrench furnished with each set.

Sizes ½ and ¾, 1 and 1¼ inches in the No. 2½-A set are double end dies.

Ring guides are standard equipment, adjustable guide furnished when specified.

Set No.	Complete With Adjustable Guide	Complete With Ring Guides	For Threading Pipe Size—Inches	Weight of Set Pounds
1-A	$10.80	$9.00	⅛, ¼, ⅜, ½	5
2-A	14.00	12.00	¼, ⅜, ½, ¾, 1	12
2-A-3	10.50	8.75	½, ¾, 1	10¼
2-A-4	12.25	10.50	⅜, ½, ¾, 1	11¼
2-A-6	16.00	14.00	⅛, ¼, ⅜, ½, ¾, 1	13
2½-A	16.50	14.00	½ and ¾, 1 and 1¼†	14
2½-A-4	21.50	19.00	¼, ⅜, ½ and ¾, 1 and 1¼†	18
2½-A-5	19.00	16.50	½, ¾, 1, 1¼, 1½	16¾
2½-A-6	21.50	19.00	⅜, ½, ¾, 1, 1¼, 1½	18
3-A	21.00	18.00	1¼, 1½, 2	29
3-A-4	24.00	21.00	1, 1¼, 1½, 2	32
3-A-5	27.00	24.00	¾, 1, 1¼, 1½, 2	37
3-A-6	30.00	27.00	½, ¾, 1, 1¼, 1½, 2	41
6-A-2	.....	50.00	2½ and 3†	80

Repair Parts

No.	Stock Complete without Dies or Guides Each	Extra Ring Guides Each	Extra Wrenches Each	Extra Collar Screws Each	Extra Guide Screws Each	Extra Adjusting Screws Each	Extra R.H. Dies Each	Extra L.H. Dies Each	Extra Handles per Pair
1-A	$3.25	$.30	$.20	$.25	$.20	$.20	$1.60	$3.20	$.75
2-A	4.00	.40	.25	.30	.30	.20	2.00	4.00	1.25
2½-A	5.25	.60	.25	.35	.30	.35	2.50	5.00	1.25
2½-A	5.25	.60	.25	.35	.30	.35	†3.50	†7.00	1.25
3-A	7.00	.75	.30	.50	.50	.40	3.50	7.00	2.50
6-A	36.00	2.00	.55	.70	.60	.50	†17.00	†34.00	*7.00

*Four handles.

†½ and ¾, 1 and 1¼ dies in No. 2½-A and No. 2½-A-4 sets are double end dies also 2½ and 3 dies in No. 6A2 set.

Armstrong Bros. Solid Pipe Dies

Easy cutting, long lasting. Has alloy steel backed-off chasers. Furnished either right or left hand in sizes listed.

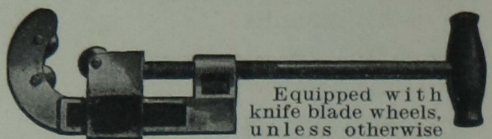
Right hand American Briggs Standard will be sent if not otherwise specified.

These dies fit any stock of standard dimensions.

For Stock No.	R. H. Each	Size Die Inches	For Threading Pipe Size, Inches
0	$1.40	2 x2 x½	⅛, ¼, ⅜, ½
1	1.60	2½x2½x¾	⅛, ¼, ⅜, ½, ¾, 1
1½	2.00	3 x3 x¾	⅛, ¼, ⅜, ½, ¾, 1, 1¼, 1½
2	2.50	4 x4 x⅞	½, ¾, 1, 1¼, 1½, 2

Left hand dies take double the list of right hand dies.

Barnes Type Pipe Cutters



Nos. 1 to 2

Equipped with knife blade wheels, unless otherwise specified, without extra charge.

Three wheel style, suitable for use where cutter cannot be revolved entirely around pipe.

No.	Complete Each	Pins per Dozen	Wheels Each	Handle and Screw Each	Cuts Pipe Inches	Wt. Lbs.
1W	$4.50	$1.00	$.50	$1.00	⅛ to 1	3
2W	6.00	1.00	.60	1.25	⅛ to 2	5
3B	10.00	1.00	.80	2.25	1½ to 3	8
4B	20.00	2.00	1.00	4.50	2½ to 4	13
5B	30.00	2.00	1.10	7.00	4 to 6	19
6B	40.00	2.00	1.10	9.25	6 to 8	22
6½B	45.00	2.00	1.10	10.25	8 to 10	33
7B	50.00	2.00	1.10	11.50	9 to 12	46

Trimo Pipe Cutters

Made with one cutting wheel and two rolls or with three cutting wheels.

Fitted with tricrome silvered wheels. Has no thread in the frame or roll block. A small case-hardened nut adjusts handle screw which can be replaced when worn. Converted into a three-wheel cutter by substituting two wheels for the two rolls. Cadmium plated, rust proof.

		Each					
No.	Cuts Pipe Inches	Complete	Knife Edge Wheels	Knurled Edge Wheels	Rolls	Nuts	Handle Only without Screw Rod
1	⅛ to 1¼	$5.00	$.60	$.60	$.30	$.35	$.50
2	⅛ to 2	6.00	.60	.60	.30	.35	.50
3	1 to 3	10.00	.90	.90	.40	.40	.50
4	2½ to 4	20.00	1.20	1.20	.40	.60	.60

Armstrong Bros. Standard Pipe Cutters

Saunders Type

Cadmium Finish

ARMSTRONG BROS. CHICAGO

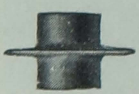
Has one cutter wheel. Two hardened rollers eliminate almost entirely burr raised by cutter wheel.

Body, handle and cutter holder are malleable iron. Pins and rollers are tool steel carefully machined and hardened. Cutter wheel is of special alloy steel, of improved shape, carefully hardened and heat treated.

No.	Complete Each	Pins Each	Rollers Each	Wheels Each	For Pipe In.	Wt. Lbs.
1-S	$3.00	$.10	$.24	$.50	⅛ to 1	3
2-S	4.50	.10	.32	.60	1 to 2	6
3-S	7.50	.15	.50	1.10	2 to 3	11½
4-S	15.00	.15	.50	1.10	2½ to 4	15
5-S	22.50	.15	.50	1.10	4 to 6	23

Tricrome Wheels, Pins and Rollers

Cadmium Plated—Red Hubs



Knife-Edge Wheel

Tricrome wheels are made of chrome vanadium steel.

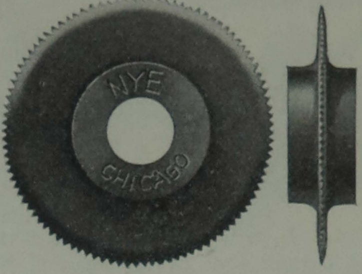
Knurled-edge and knife-edge wheels have same list price.

*Made to fit.

Knurled-Edge Wheel

Cutter No.	Wheels Each			Pins Per Doz.			Rollers Each	
	Trimo	*Barnes	*Saunders	Trimo	*Barnes	*Saunders	Trimo	*Saunders
1	$.60	$.50	$.50	$1.30	$1.00	$1.20	$.30	$.24
2	.60	.60	.60	1.30	1.00	1.20	.30	.32
3	.90	.80	1.10	1.30	1.00	1.80	.40	.50
4	1.20	1.00	1.10	2.00	2.00	1.80	.40	.50
5	....	1.10	1.10	....	2.00	1.80	...	.60
6	....	1.10	....	....	2.00	....	...	...
6½	....	1.10	....	....	2.00	....	...	...
7	....	1.10	....	....	2.00	....	...	...

Nye Knife Blade Cutter Wheels



Made from high grade tool steel, hardened and tempered in oil. The blades are less than ⅛th of an inch thick and are straight from the hub to the cutting edge.

They cut with one-third the power and time required by the old type wheels.

Made both knurled and smooth-edged; same price.

No.		Each	No.		Each	No.	Each	No.	Each
1	Barnes	$.50	1	Saunders	$.50	1 Nye	$.70	†1 & 2R	$.60
2	Barnes	.60	2	Saunders	.60	2 Nye	.80	†3 & 4R	.90
3	Barnes	.80	3	Saunders	1.10	*1A	.60	1 Nye Univ.	.50
4	Barnes	1.00	4	Saunders	1.10	*2A	.60	2 Nye Univ.	.60
5 & 6	Barnes	1.10	5	Saunders	1.10	*3A	.90	4 Nye Univ.	1.00

*Made to fit Trimo Type. †Made to fit Rigid Type.

Dixon's Pipe Joint Graphite Compound

DIXON'S
PIPE JOINT GRAPHITE
COMPOUND

Water insoluble. Functions both as a lubricant and a seal on all threaded, gasketed and flange pipe and other joints to make them tight against hot and cold water, all aqueous solvents, steam, air, gas, acids, alkalies and brine.

Assures quick easy assembling and disassembling of connections without damage to gaskets or fittings.

The ¼-pound quantity furnished in tubes, 25 and 50-pound quantities in buckets, all other sizes in cans.

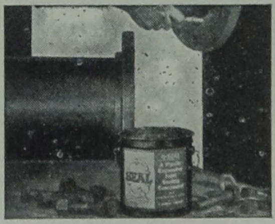
Size Container..........lbs.	¼	1	5	10	25	50
Per Pound..................	*$.25	.35	.30	.28	.26	.24
No. per Case..............	36	36	10	6	...	...

*Price per tube.

In larger containers, prices upon application.

Q-Seal Plastic Expansive Joint Sealing Compound

High Pressure Steam, Oil, Acid and Chemical-Proof



For threaded, flange, gasket and metal-to-metal joints in pipe lines and equipment handling high pressure steam, acids, oils, gasoline, kerosene, creosote, tar, ammonia, brine and other commodities.

Q-Seal is a natural preserver of metal—prevents oxidation or frozen joints. Double expansion (pigment and vehicle) insures tight joints. Withstands high temperatures and pressures, stays in uniform suspension, is easy to use and does not spoil.

In 1, 5, 10, 30, 60, 350 and 500-pound containers.
Prices and further information upon application.

Damit Waterproof Joint Sealing Compound

A waterproof, non-corrosive, plastic filler for sealing threaded and flanged connections in lines carrying water for drinking and other purposes, manufactured or natural gas, air and low pressure (heating) steam. Will make up, leakproof, joints that are imperfect from battered, undercut or unequally taped threads.

This compound makes wrapping of threads in brass piping unnecessary. Joints fabricated with Damit can be broken with ease whenever necessary. Does not shrink, remains plastic, unaffected by vibration or contraction and expansion of metal.

In 1, 5, 10, 30, 60, 350 and 500-pound containers.
Prices and further information upon application.

No. 1 Little Giant Single Stock Screw Plates

LITTLE GIANT SCREW PLATE
G.T.D.
NO. 1

Cuts 5 Sizes N.C.: $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$ and $\frac{1}{2}^{13}$-inch. Hand taps; Little Giant Dies; 2-inch diameter collets; stock, 14½ inches long; adjustable tap wrench, No. 5, 11 inches long and bit brace shank. Weight, 9 pounds.

Price, No. 1............................per set **$18.50**

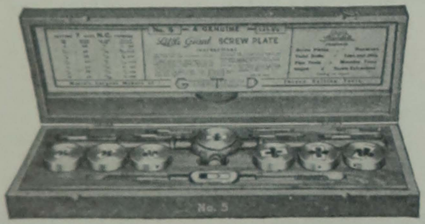
No. 2 Little Giant Single Stock Screw Plates

LITTLE GIANT SCREW PLATE
G.T.D.
No. 5

Cuts 5 sizes U. S. Standard: $\frac{1}{4}^{20}$, $\frac{3}{8}^{16}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$; 2¾-inch diameter collet. Stock, 23 inches long. Tap wrench No. 6. Weight, 17 pounds.

Price, No. 2..............................per set **$22.75**

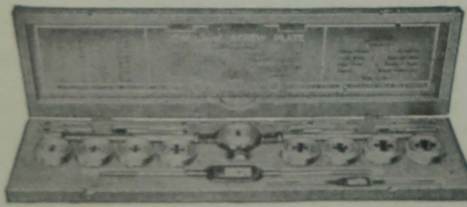
No. 5 Little Giant Single Stock Screw Plates



Cuts 7 sizes, N.C.: $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$. Hand taps; Little Giant Dies; 2¾-inch diameter collets; stock, 23 inches long; adjustable tap wrench No. 6, 15 inches long.

Weight 20 pounds per set.
No. 5....................................per set **$27.50**

No. 7 Little Giant Single Stock Screw Plates



Cuts 9 sizes, N.C.: $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}, hand taps; Little Giant Dies; 2¾-inch diameter collets; stock, 26 inches long and 2 adjustable tap wrenches, No. 5, 11 inches long, and No. 7, 19 inches long.

Weight 27 pounds per set.
No. 7.....................................per set **$42.00**

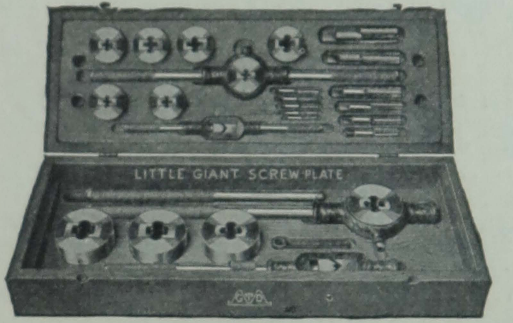
No. 9 Little Giant Two Stock Screw Plates

Little Giant SCREW PLATE
G.T.D.
GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASS.

Cuts 9 sizes, N. C.: $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}. Hand taps, Little Giant Dies; 2 inch diameter collets for sizes 7/16 inch and smaller, 2¾ inch for ½-inch and larger; bit brace shanks fitting 2-inch collets; stocks, 14½ and 29 inches long; tap wrenches, Nos. 5 and 7. Weight, 26 pounds

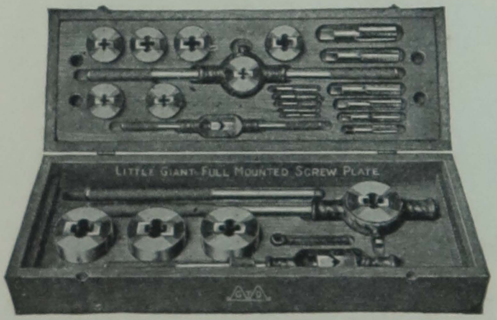
Price, No. 9.............................per set **$43.50**

No. 40 Little Giant Two Stock Screw Plates



Cuts 11 sizes, N. C. threads: $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}; $1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$, hand taps; Little Giant Dies; 2¾-inch diameter collets for sizes ¾-inch and smaller, 4-inch for ⅞-inch and larger; stocks 23 and 41 inches long; tap wrenches Nos. 6 and 7½. Weight 57½ pounds.
No. 40..per set **$68.50**

No. 50 Little Giant Two Stock Screw Plates



Cuts N. C. threads: $\frac{1}{4}^{20}$, $\frac{5}{16}^{18}$, $\frac{3}{8}^{16}$, $\frac{7}{16}^{14}$, $\frac{1}{2}^{13}$, $\frac{5}{8}^{11}$, $\frac{3}{4}^{10}$, $\frac{7}{8}^{9}$, 1^{8}, $1\frac{1}{8}^{7}$, $1\frac{1}{4}^{7}$, $1\frac{3}{8}^{6}$, $1\frac{1}{2}^{6}$ hand taps; Little Giant Dies; 2¾-inch collets for sizes 1-inch and smaller and 4½ inch for sizes 1⅛-inch and larger; stocks 26 and 52 inches long; tap wrenches Nos. 6 and 8. Weight, 84 pounds.

No. 50..per set **$92.00**

No. AA4 Little Giant Screw Plates

Machine Screw Sizes

LITTLE GIANT SCREW PLATE
G.T.D.
No. AA4

Cuts 7 sizes N. F. and N. C. Standard: 4–36, 6–32, 8–32, 10–24, 10–32, 12–24, ¼–20; 1¼-inch diameter collet.

Length of stock, 7½ inches. Tap wrench No. 0.

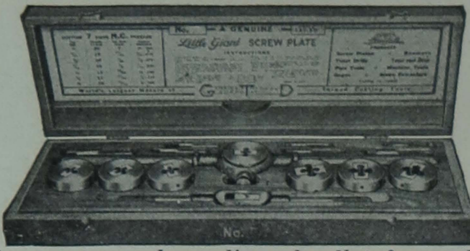
With one tap and one die and collet for each cutting size.

National Form threads furnished unless otherwise ordered. B.S.F. or Whitworth Standard threads furnished at regular prices if specified.

Net weight, 3 pounds.
No. AA4...per set **$14.50**

Little Giant Single Stock Screw Plates

With N.F. Threads



Contains one tap and one die and collet for each cutting size. No. 31 Set has bit brace shank.

No. 31

Cuts 5 sizes N. F. Standard: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}; bit brace shank and 2-inch diameter collet. Stock 14½ inches long. Tap wrench No. 5. Weight, 8 pounds.

No. **31**.................................per set **$18.50**

No. 35

Cuts 7 sizes N. F. Standard: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}, ⅝^{18}, ¾^{16}; 2¾-inch diameter collet. Stock, 23 inches long. Tap wrench No. 6. Weight, 20 pounds.

No. **35**.................................per set **$27.50**

No. 35½

Cuts 8 sizes N. F. Standard: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}, 9⁄16^{18}, ⅝^{18}, ¾^{16}; 2¾-inch diameter collet. Stock, 23 inches long. Tap wrench No. 6. Weight, 22 pounds.

No. **35½**.................................per set **$30.75**

No. 37

Cuts 9 sizes N. F. Standard: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}, ⅝^{18}, ¾^{16}, ⅞^{14}, 1^{14}; 2¾-inch diameter collet. Stock 26 inches long. Two tap wrenches, Nos. 5 and 7. Weight, 27 pounds.

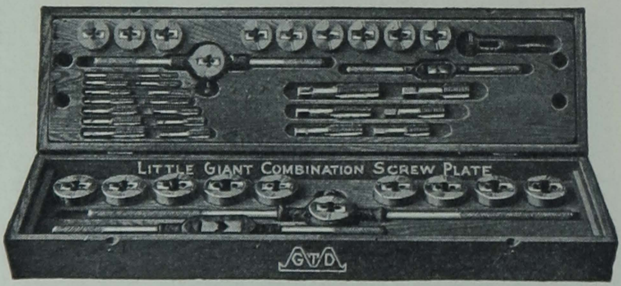
No. **37**.................................per set **$42.00**

No. 37½

Cuts 10 size N. F. Standard: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}, 9⁄16^{18}, ⅝^{18}, ¾^{16}, ⅞^{14}, 1^{14}; 2¾-inch diameter collet. Stock, 26 inches long. Two tap wrenches, Nos. 5 and 7. Weight, 30 pounds.

No. **37½**.................................per set **$44.25**

Little Giant Combination Screw Plates



These screw plates contain N.C. and N.F. taps. Little Giant dies for each size; 2-inch collets for sizes ½-inch and smaller; 2¾-inch collets for sizes 9⁄16 inch and larger; and bit brace shank fitting 2-inch caps. Whitworth threads substituted for N.C. at regular prices.

No. 310

Cuts 5 sizes N.C.: ¼^{20}, 5⁄16^{18}, ⅜^{16}, 7⁄16^{14}, ½^{13}, and N.F.: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}; bit brace shank and 2-inch diameter collet. Stock, 14½ inches long. Tap wrench No. 5. Weight, 14 pounds.

No. **310**.................................per set **$29.25**

No. 311

Cuts 8 sizes N.C.: ¼^{20}, 5⁄16^{18}, ⅜^{16}, 7⁄16^{14}, ½^{13}, 9⁄16^{12}, ⅝^{11}, ¾^{10}, and N.F.: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}, 9⁄16^{18}, ⅝^{18}, ¾^{16}; bit brace shank and 2 and 2¾-inch diameter collets. Two stocks, 14½ and 23 inches long. Tap wrench No. 6. Weight, 31 pounds.

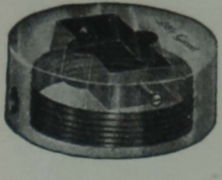
No. **311**.................................per set **$56.00**

No. 312

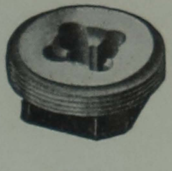
Cuts 10 sizes N.C.: ¼^{20}, 5⁄16^{18}, ⅜^{16}, 7⁄16^{14}, ½^{13}, 9⁄16^{12}, ⅝^{11}, ¾^{10}, ⅞^{9}, 1^{8}, and N.F.: ¼^{28}, 5⁄16^{24}, ⅜^{24}, 7⁄16^{20}, ½^{20}, 9⁄16^{18}, ⅝^{18}, ¾^{16}, ⅞^{14}, 1^{14}; bit brace shank and 2 and 2¾-inch diameter collets. Two stocks, 14½ and 29 in. long. Two tap wrenches Nos. 5 and 7. Weight, 45 pounds.

No. **312**.................................per set **$79.00**

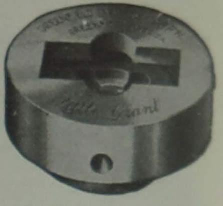
Little Giant Collets



Cap (Phantom View)



Guide



Collet, Complete

The table below shows in detail the range of sizes in each collet.

In ordering extra collets or guides, it is only necessary to give the outside diameter of the collet and the cutting size of the die for which it is required.

Standard Sizes

Collet Number	Outside Diam., In.	Dimensions of Slot, Inches	Take Dies of Following Sizes
A1	1¼	23⁄64x 25⁄32	All Sizes A1 Die
¼ No. 1	2	½ x1 7⁄16	3⁄16, ¼, 5⁄16
⅜ No. 1	2	19⁄32x1 7⁄16	⅜, 7⁄16, ½
¼ No. 5	2¾	½ x1 7⁄16	3⁄16, ¼, 5⁄16
⅜ No. 5	2¾	19⁄32x1 7⁄16	⅜, 7⁄16
½ No. 5	2¾	27⁄32x1 13⁄16	½, 9⁄16, ⅝, 11⁄16, ¾
⅞ No. 5	2¾	*1 1⁄32 x2¼	13⁄16, ⅞, 15⁄16, 1
½ No. 20	4	27⁄32x1⅞	⅝, 11⁄16, ¾
⅞ No. 20	4	*1 1⁄32 x2¼	13⁄16, ⅞, 15⁄16, 1
1⅛ No. 20	4	1¼ x2 11⁄16	1 1⁄16, 1⅛, 1 3⁄16, 1¼
⅞ No. 25	4½	*1 1⁄32 x2¼	13⁄16, ⅞, 15⁄16, 1
1⅛ No. 25	4½	1¼ x2⅝	1 1⁄16, 1⅛, 1 3⁄16, 1¼
1⅜ No. 25	4½	1½ x3⅛	1 5⁄16, 1⅜, 1 7⁄16, 1½

*Round ends.

Prices

No. of Collet	Collet Diam., In.	Cutting Size of Dies, In.	Each: Cap	Each: Guide	Each: Complete
A1	1¼	0–16 1⁄16 –9⁄32	$.35	$.20	$.55
1	2	3⁄16 –½	.50	*.30	.80
5	2¾	3⁄16 –1	.80	.50	1.30
20	4	⅝ –1¼	1.50	.75	2.25
25	4½	13⁄16–1½	2.00	1.00	3.00

*Bit Brace Shank Guide for 2-inch diameter cap, $.50; for 2¾-inch diameter cap, $.75.

Little Giant Stocks

For Screw Plates

The body of each Little Giant stock has a mottled and polished finish; the handles are polished with a knurling on the ends so that greasy or oily hands will be able to take a sure grip.

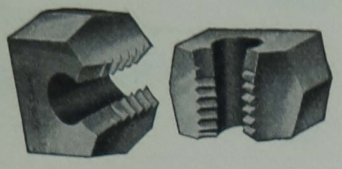
Used in all Little Giant Screw Plates except full mounted. In each assortment one stock accommodates all the collets of the same outside diameter. Screw plates with two sizes of collets require two corresponding stocks.

Stocks can be furnished complete with die and collet, making a complete equipment for cutting any one size of thread.

Stock No.	Each	Collet Diameter, In.	Length of Stock, In.
A1	$1.25	1¼	7½
1	2.50	2	14½
5	3.50	2¾	23
7	3.50	2¾	26
9	3.50	2¾	29
20	6.00	4	41
25	8.00	4½	52

Little Giant Adjustable Dies

Fractional Sizes



National Coarse threads furnished unless otherwise specified.

Sizes, dimensions and threads not listed are subject to special prices. Left-hand dies are special.

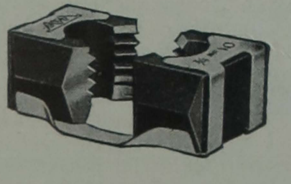
In ordering dies, specify outside diameter of collet, and the cutting size and number of threads per inch.

Cutting Size In.	Diam. Collets Inches 1 1/4 Each	Diam. Collets Inches *2. 2 3/4 4, 4 1/2 Each	No. of Threads to the Inch Standard Pitches N.C.	N.F.	Whit. Std.	BSF (Whit. Form)	Also Furnished N.S.
1/16	$.75	....	..	..	60	..	64
5/64	.75	....	..	..	..	..	60
3/32	.75	....	..	..	48	..	48, 50
7/64	.75	....	..	..	..	..	48
1/8	.75	....	..	..	40	..	40
9/64	.75	....	..	..	..	..	40
5/32	.75	....	..	..	32	..	32, 36
3/16	.75	$1.00	..	..	24	..	24, 32
7/32	.75	1.00	..	..	24	..	24, 32
1/4	.75	1.00	20	28	20	26	24, 27, 32
5/16	...	1.00	18	24	18	22	20, 27, 32
3/8	...	1.25	16	24	16	20	20, 27
7/16	...	1.25	14	20	14	18	24, 27
1/2	...	1.50	13	20	12	16	12, 24, 27
9/16	...	1.50	12	18	12	16	27
5/8	...	1.75	11	18	11	14	12, 27
11/16	...	1.75	..	..	11	14	11, 16
3/4	...	2.00	10	16	10	12	12, 27
13/16	...	2.75	..	..	10	12	10
7/8	...	2.75	9	14	9	11	12, 18, 27
15/16	...	2.75	..	..	9	..	9
1	...	2.75	8	14	8	10	12, 27
1 1/8	...	4.00	7	12	7	9	.....
1 1/4	...	4.00	7	12	7	9	.....
1 3/8	...	5.00	6	12	6	8	.....
1 1/2	...	5.00	6	12	6	8	.....

*2-inch diameter collets take dies 3/16–1/2-inch.
2 3/4-inch diameter collets take dies 3/16–1-inch.
4-inch diameter collets take dies 5/8–1 1/4-inch.
4 1/2-inch diameter collets take dies 13/16–1 1/2-inch.

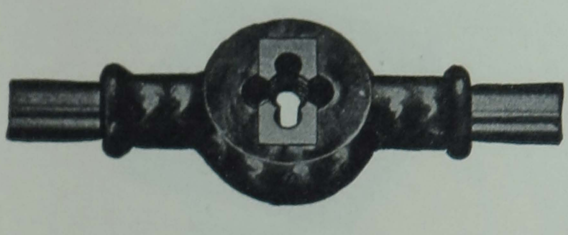
Little Giant pump rod dies 3/8–14 and 7/16–12, 1/2–12 V form 1/32 inch oversize, for use in regular collets or with bit brace shank guide can be furnished at regular prices of Little Giant Dies of corresponding size.

Little Giant Jr. Die Clips



A new patented die clip, one of which is furnished for each size in screw plate, holds two halves of the Little Giant Die as a single unit. It facilitates handling, inserting and removing die from stock—and keeps the die halves from becoming separated and lost. The clip, which has a cadmium-plated, rust-proof finish, is made from high-quality, spring-tempered steel, which gives it strength and flexibility. The dies fit directly into slots in stock and are held in place by a screw guide. Witness marks on face of stock and thumb screws on sides, make it easy to adjust dies to exact size.

Little Giant Full Mounted Stocks

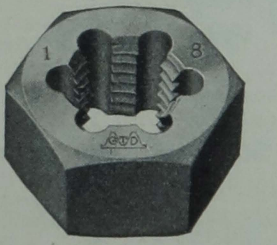


The die slot in this stock is beveled to fit Little Giant Dies.

When ordered complete, each die is adjusted with its guide in a separate stock and is ready for use.

Size Inches	Length Stock Inches	Each Stock Only	Guide Only	Die Only	Stock, Die and Guide Complete
3/16	8 3/4	$1.60	$.30	$1.00	$2.90
1/4	8 3/4	1.60	.30	1.00	2.90
5/16	8 3/4	1.60	.30	1.00	2.90
3/8	13 1/2	1.90	.30	1.25	3.45
7/16	13 1/2	1.90	.30	1.25	3.45
1/2	20 1/2	2.25	.50	1.50	4.25
9/16	20 1/2	2.25	.50	1.50	4.25
5/8	25	2.75	.50	1.75	5.00
11/16	25	2.75	.50	1.75	5.00
3/4	25	2.75	.50	2.00	5.25
13/16	29	3.25	.50	2.75	6.50
7/8	29	3.25	.50	2.75	6.50
15/16	29	3.25	.50	2.75	6.50
1	29	3.25	.50	2.75	6.50
1 1/8	39 1/2	4.50	.75	4.00	9.25
1 1/4	39 1/2	4.50	.75	4.00	9.25
1 3/8	49	6.75	1.00	5.00	12.75
1 1/2	49	6.75	1.00	5.00	12.75

No. 377 G T D Solid Hexagon Re-Threading Dies



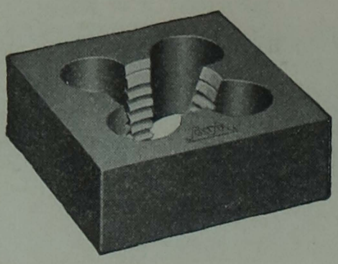
These dies are used only for repair work, for dressing over bruised or rusty threads, and will go into any space that hexagon nuts will go.

They can be used in bit-brace sockets, ratchet or monkey wrenches, and will be found convenient in many ways. They are accurate, durable and will give satisfactory service.

National Coarse (N. C.) threads furnished unless otherwise ordered.

Size Inches	Each	Threads, per Inch N.C.	N.F.	N.S.	Whit. Std.	Size of Die Across Flats	Thickness
1/4	$.70	20	28	..	20	19/32	1/4
5/16	.80	18	24	..	18	11/16	5/16
3/8	.90	16	24	..	16	25/32	3/8
7/16	1.00	14	20	..	14	7/8	7/16
1/2	1.10	13	20	..	12	1 1/16	1/2
9/16	1.20	12	18	..	12	1 1/16	1/2
5/8	1.40	11	18	..	11	1 1/4	5/8
11/16	1.60	..	..	11, 16	11	1 7/16	3/4
3/4	1.80	10	16	..	10	1 7/16	3/4
7/8	2.10	9	14	18	9	1 5/8	7/8
1	2.40	8	14	..	8	1 13/16	1
1 1/8	2.80	7	12	..	7	2	1
1 1/4	3.20	7	12	..	7	2 3/16	1
1 3/8	3.60	6	12	..	6	2 3/8	1
1 1/2	4.00	6	12	..	6	2 9/16	1

G T D Solid Square Bolt Dies

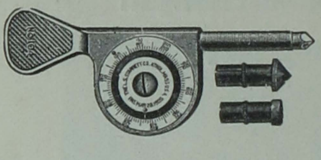


Sizes, dimensions and threads not listed are subject to special prices.

Left-hand dies are special.

Cutting Size Inches	Each	Threads Per Inch N.C.	N.S.	Size Square Inches	Thickness Inches
1/4	$1.80	20	..	2½	½
5/16	1.80	18	..	2½	½
3/8	1.80	16	..	2½	½
7/16	1.80	14	..	2½	½
1/2	1.80	13	..	2½	¾
9/16	1.90	12	..	2½	¾
5/8	2.00	11	..	2½	¾
3/4	2.20	10	..	2½	¾
7/8	2.40	9	..	2½	¾
1	2.70	8	..	2½	1
1⅛	3.00	7	..	2½	1
1¼	3.30	7	..	2½	1
1⅜	3.60	6	..	2½	1
1½	3.90	6	..	3	1
1⅝	4.20	..	5½	3	1
1¾	5.40	5	..	3	1¼
1⅞	6.50	..	5	3½	1½
2	7.50	4½	..	3¾	2

No. 104 Starrett High Speed Indicators



This indicator may be run at high speed without heating.

Working parts are encased and instrument is nickel-plated.

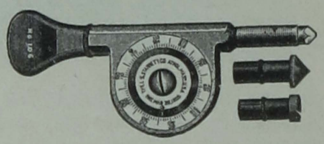
No. **104**, in Pasteboard Box	each	**$1.25**
No. **104**, in Leather Case	each	**2.60**

No. 106 Starrett Speed Indicators

The graduations show every revolution, and two rows of figures read right and left as the shaft may run.

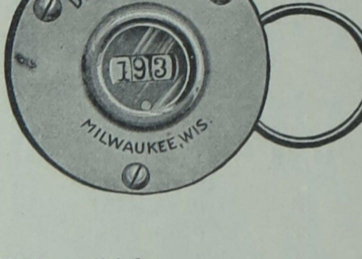
Nickel-plated.

Packed 1 in a box.



Price, No. **106**, in Pasteboard Box	each	**$1.85**
Price, No. **106**, in Leather Case	each	**3.20**

Durant Hand Tallies


DURANT MFG. CO.
193
MILWAUKEE, WIS.

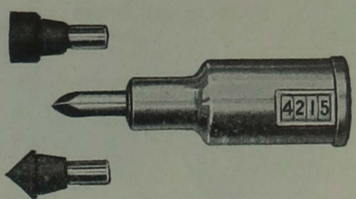
This device is invaluable in amusement places, hotels, loading platforms, stock yards, lumber mills, etc.

The tally is 2 inches in diameter and fits hand like a watch. Totals can readily be reset to zero.

Working parts are brass and steel; case, nickel-plated.

Plain, 3-Dial	each	**$2.25**
Plain, 4-Dial	each	**2.75**
For Pin or Bracket Attachment, Add	each	**.25**

No. 21 Veeder-Root Speed Counters



This counter records the r.p.m. of engines, motors, etc.

The tip is held against the center of shaft or flywheel. Pressure is applied to start; released to stop.

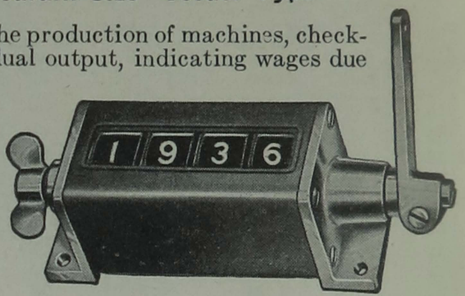
The clutch works instantly.

Furnished with 2 rubber tips.

No. **21**	each	**$3.50**
Extra Tips	each	**.25**

Veeder-Root Reset Revolution Counters

Medium Size—Veeder Type



For recording the production of machines, checking up the individual output, indicating wages due piece-workers.

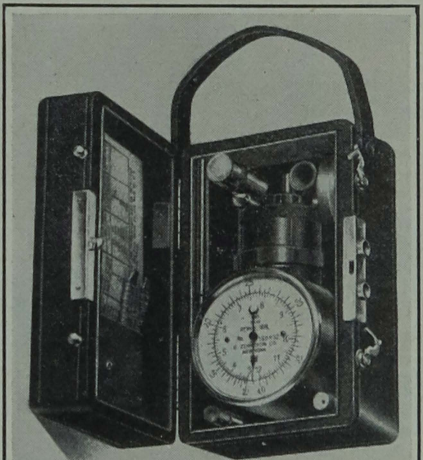
This counter registers one for each revolution of a shaft, recording an operation of the machine.

Reset to zero by turning knob. Supplied with from 4 to 8 figure-wheels.

With 4 Figure-Wheels	each	**$10.00**

With lock and keys to prevent tampering with record add $2.00. For each figure wheel more than 4 add $1.00.

0-Z Improved Hand Tachometers



The 0-Z Tachometer indicates accurately without timing or calculating of any sort:

a. The r. p. m., right or left, of revolving objects (shafts, spindles, etc.)

b. The surface or peripheral speeds in f.p.m., right or left, of traveling objects (flywheels, pulleys, belts, drums, lathes, planers).

c. Speed variations occuring during a fraction of a revolution.

d. Belt slipping and, consequently, waste of power.

The moment the pointer or cutmeter wheel is held against the object under test, the readings, as outlined above, are taken instantaneously—at a glance.

The gear shift is of the rotating type. The shifting is done in a most efficient and simple manner, by turning the tachometer barrel with the thumb and index finger of the hand holding the instrument, until the desired range is in line with the dial center and a spring lock is felt to engage inside. Large ivory finished dial, 2½ inches in diameter. Graduations are black, clear cut and easy to read.

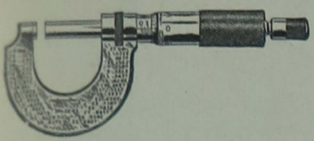
Tachometers are of the single spindle, triple, quadruple and quintuple, selective range type. They are made for speeds from 20 up to 40,000 r.p.m.

Length over all, 4¾ inches. Net weight, 12 ounces.

Instrument and accessories packed in a plush lined carrying case, 5¾x3½x3 inches; shipping weight, 1½ pounds.

Prices upon application.

Lufkin 1-Inch Micrometer Calipers



With Full Finished Cut-Away Frame Rapid Reading

Range, 0 to 1 Inch

Packed 1 in box. Wt., 7 oz.

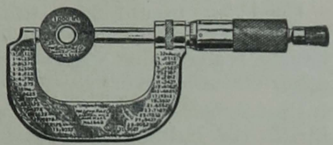
For Measuring by Thousandths of an Inch

No.	Description	Each
1611	Plain, without Lock Nut or Ratchet Stop..	$8.50
1621	With Lock Nut, without Ratchet Stop....	9.50
1641	With Lock Nut and Ratchet Stop.........	10.00

For Measuring by Ten-Thousandths of an Inch

1611V	Plain, without Lock Nut or Ratchet Stop.	$10.25
1621V	With Lock Nut, without Ratchet Stop....	11.25
1641V	With Lock Nut and Ratchet Stop.........	11.75

Lufkin 2-Inch Micrometer Calipers



With Full Finished Cut-Away Frame and 1-Inch Test Gauge Rapid Reading

Packed one in a box. Weight, 10 ounces.

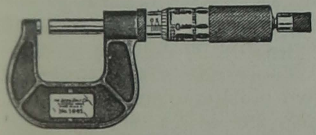
For Measuring by Thousandths of an Inch

No.	Description	Each
1612	Plain, without Lock Nut or Ratchet Stop..	$9.50
1622	With Lock Nut, without Ratchet Stop....	10.50
1642	With Lock Nut and Ratchet Stop.........	11.00

For Measuring by Ten-Thousandths of an Inch

1612V	Plain, without Lock Nut or Ratchet Stop.	$11.25
1622V	With Lock Nut, without Ratchet Stop....	12.25
1642V	With Lock Nut and Ratchet Stop.........	12.75

Lufkin 1-Inch Micrometer Calipers



Enameled Frame Rapid Reading

Range, 0 to 1 Inch

Packed one in a box. Weight, 6 ounces.

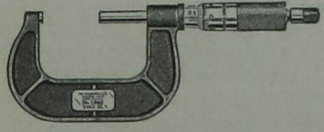
For Measuring by Thousandths

No.	Description	Each
1811	Plain, without Lock Nut or Ratchet Stop..	$6.25
1821	With Lock Nut, without Ratchet Stop.....	7.25
1831	With Ratchet Stop, without Lock Nut.....	6.75
1841	With Lock Nut and Ratchet Stop..........	7.75

For Measuring by Ten-Thousandths

1811V	Plain, without Lock Nut or Ratchet Stop..	$8.00
1821V	With Lock Nut, without Ratchet Stop.....	9.00
1831V	With Ratchet Stop, without Lock Nut.....	8.50
1841V	With Lock Nut and Ratchet Stop..........	9.50

Lufkin 2-Inch Micrometer Calipers



Enameled Frame Rapid Reading

Range, 1 to 2 inches

Packed, one in a box. Weight, 8 ounces.

For Measuring by Thousandths of an Inch

No.	Description	Each
1812	Plain, without Lock Nut or Ratchet Stop..	$7.00
1822	With Lock Nut, without Ratchet Stop....	8.00
1842	With Lock Nut and Ratchet Stop.........	8.50

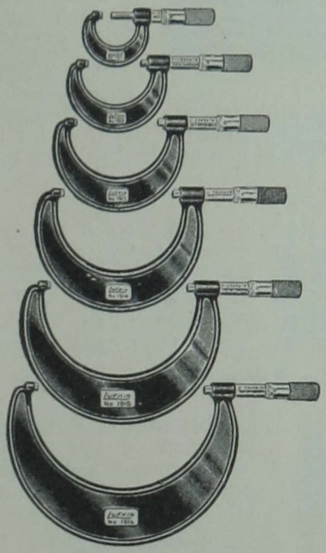
For Measuring by Ten-Thousandths of an Inch

1812V	Plain, without Lock Nut or Ratchet Stop.	$8.75
1822V	With Lock Nut, without Ratchet Stop....	9.75
1842V	With Lock Nut and Ratchet Stop.........	10.25
....	Extra for 1-Inch Test Gauge for Above....	1.00

Lufkin Micrometer Calipers

Rapid Reading

For Measuring by Thousandths of an Inch



Especially designed for production work.

These calipers have sturdy ribbed frames to withstand the hard usage.

Micrometers are sent without test gage unless otherwise ordered.

Frame is finished in green enamel.

Packed one in a box.

Range, 0 to 1 Inch

No.	Description	Wt. Oz.	Each
1911	Plain, without Locknut or Ratchet Stop.	7	$6.25
1921	With Locknut, without Ratchet Stop....	7	7.25
1941	With Locknut and Ratchet Stop........	7	7.75

Range, 1 to 2 Inches

1912	Plain, without Locknut or Ratchet Stop.	9	$7.00
1922	With Locknut, without Ratchet Stop....	9	8.00
1942	With Locknut and Ratchet Stop........	9	8.50
	Extra for 1-Inch Test Gage..................	..	1.00

Range, 2 to 3 Inches

1913	Plain, without Locknut or Ratchet Stop.	12	$7.75
1923	With Locknut, without Ratchet Stop....	12	8.75
1943	With Locknut and Ratchet Stop........	12	9.25
	Extra for 2-Inch Test Gage..................	..	1.25

Range, 3 to 4 Inches

1914	Plain, without Locknut or Ratchet Stop.	19	$8.50
1924	With Locknut, without Ratchet Stop....	19	9.50
1944	With Locknut and Ratchet Stop........	19	10.00
	Extra for 3-Inch Test Gage..................	..	1.50

Range 4 to 5 Inches

1915	Plain, without Locknut or Ratchet Stop.	22	$9.25
1925	With Locknut, without Ratchet Stop....	22	10.25
1945	With Locknut and Ratchet Stop........	22	10.75
	Extra for 4-Inch Test Gage..................	..	1.75

Range, 5 to 6 Inches

1916	Plain, without Locknut or Ratchet Stop.	27	$10.00
1926	With Locknut, without Ratchet Stop....	27	11.00
1946	With Locknut and Ratchet Stop........	27	11.50
	Extra for 5-Inch Test Gage..................	..	2.00

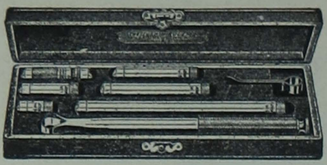
When micrometers are wanted reading in ten-thousandths of an inch, add suffix "V" as 1911V. Extra for ten-thousandths, $1.75 each.

NOTE: Micrometers in the above style, with ranges from 6 to 12 inches, can be furnished.

Micrometer Sets

The above Micrometers, from 0 to 12 inches, are furnished in sets of various combinations. They are packed in well-built wooden boxes, with hinged cover. Prices on application.

Lufkin Inside Micrometers



Extension tubes or rods are of steel tubing making the tool rigid and durable.

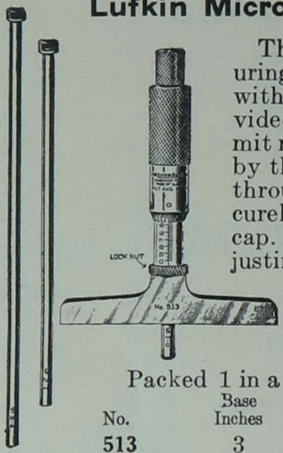
Nos. 680A and 680B have ½-inch movement of screw; Nos. 681C, 681D and 681K have 1-inch movement of screw. No. 6801D has both the ½ and 1-inch movement heads.

For measuring by thousandths of an inch.

Each set is packed in a finished wooden box, as illustrated.

No.	Each	Range Inches	No. of Rods	Wt., Oz. Each
680A	$12.00	1½ to 8	5	8½
680B	15.00	1½ to 12	8	12
681C	18.00	4 to 24	7	27
681D	20.00	4 to 32	8	39
681K	24.00	4 to 40	10	48
6801D	30.00	1½ to 32	10	56

Lufkin Micrometer Depth Gages



This gage is designed for use in measuring the depth of holes, slots, etc., with micrometer accuracy. Gage is provided with 3 measuring rods which permit measurements from zero to 3 inches by thousandths. The rods are inserted through a hole in the screw and are securely fastened by means of a knurled cap. Each rod is equipped with an adjusting nut to maintain their individual lengths.

Each gage is equipped with a patent lock nut which permits the reading to be maintained.

Packed 1 in a hinged wooden box with clasp.

No.	Base Inches	Range Inches	Wt., Oz. Each	Price Each
513	3	0 to 3	12	$10.50
515	5	0 to 3	18	13.50

No. 511 Lufkin Depth Gauges

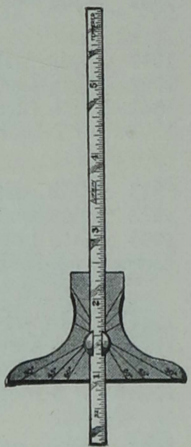
The head of this gauge is made of steel, case-hardened, 2½ inches wide across the base, ⅛-inch thick, and is designed to fit the hand. The notch on one side of the head allows easy reading of graduations.

The blade is fitted securely into a slot on one side of the head and is held in place by means of a knurled nut and tension spring.

Furnished with six-inch narrow spring tempered blade marked 32nds and 64ths.

One side of the head is marked both right and left with 30, 45 and 60 degree lines, to which the blade can be swung and set. The tool therefore serves not only as a depth gauge, but as a simple protractor.

Price, No. **511**................each **$2.25**

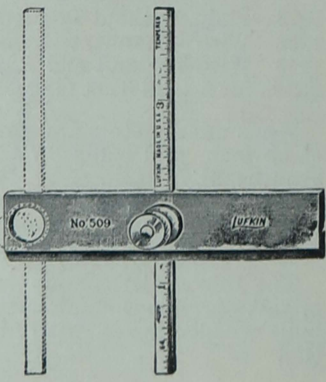


No. 509 Lufkin Depth Gauges

Range covers almost any requirement. Steel rule slides in a groove properly fitted for it, and held in place by a knurled nut and tension spring. Can be used in either position, in center or at end of base.

Measuring edge is beveled.

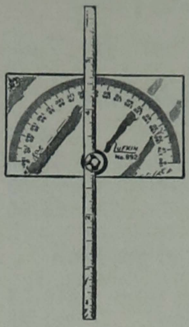
Steel rules furnished graduated 32nds and 64ths, unless otherwise specified.



No.	Each	Base In.	Rod In.	Wt., Oz.
509A	$1.50	3½	4	2
509B	1.80	3½	6	3
509C	1.80	6	4	4
509D	2.10	6	6	4
509E	2.70	10	6	6

No. 892 Lufkin Protractor and Depth Gauges

This is a very handy tool for machinists, draftsmen and other mechanics in setting bevels, transferring angles or as a depth gauge.



The rectangular head gives 4 working faces. It is graduated in degrees from 0 to 180, with 2 rows of figures reading both ways. Back of tool is flat.

The steel rule is the regular 6-inch narrow pattern, graduated 64ths one side and 32nds other side. It is adjustable and can be set at any length within its capacity for use as a depth gauge. It can be securely held by means of the knurled thumb nut.

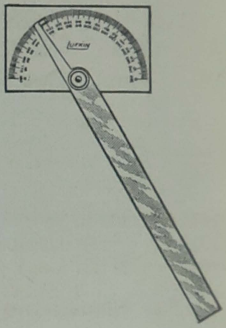
Packed one in a box.

Weight each, 3 ounces.

No. **892**......................each **$3.00**

No. 891 Lufkin Steel Protractors

Used by machinists, draftsmen and other mechanics in setting bevels, transferring angles and many other classes of work.

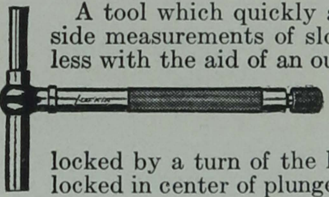


Protractor is equipped with a blade, the indicating arm of which has a line graduation for accurately setting or reading the protractor. The blade is 6 inches long and can be securely held by means of the knurled thumb nut and tension spring.

The rectangular head gives four working faces; it is graduated in degrees from 0 to 180, with two rows of figures reading both ways. The back of the tool is flat.

No. **891**, With Blade, Packed 1 in a Box.........each **$3.00**

No. 79 Lufkin Telescoping Gages



A tool which quickly and accurately obtains the inside measurements of slots or holes to thousandths or less with the aid of an outside micrometer.

Tool consists of a handle and two plungers, one telescoping into the other which can be locked by a turn of the knurled screw. Handle can be locked in center of plungers. Ends of plungers are hardened and ground to a radius that clears in the smallest hole it will enter.

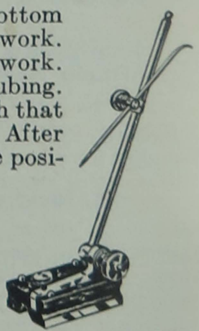
Packed 1 in a box.

No.......	79AA	79A	79B	79C	79D	79E
Range..in.	5/16–½	½–¾	¾–1¼	1¼–2⅛	2⅛–3½	3½–6
Each.....	$1.80	1.80	2.10	2.40	3.00	3.60

No. **79SX** Set, One Each of Nos. 79AA, 79A, 79B, 79C, 79D, 79E, in Leatherette Folder.............each **$16.20**

No. **79SSX** Set, One Each of Nos. 79AA, 79A, 79B and 79C, in Leatherette Folder..................each **9.10**

Lufkin Universal Surface Gauges



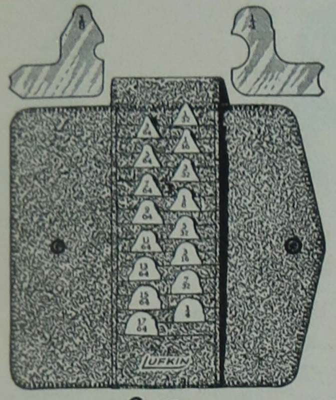
The base is well proportioned, the bottom and end being grooved out for cylindrical work. Has 4 gauge pins used as guides on linear work. The spindle is made of rigid hollow steel tubing. It can be used upright, at any angle or such that the scriber can be used below the base. After the spindle is clamped in the approximate position desired, the fine adjustment nut at one end is used to get the exact setting.

The hardened base is finished in mottled blue with all measuring faces ground and polished.

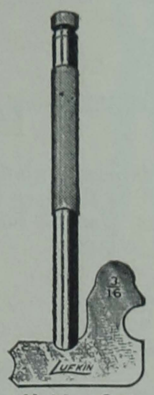
Packed 1 in a box.

No.	Size Base Inches	Spindle Inches	Wt., Lbs. Each	Price Each
520A	3¼	9	2¾	$5.50
520B	3¼	9 and 12	3	6.00
520C	3¼	12	2¾	5.75

Lufkin Improved Radius Gauges



Gauge



Holder Only

Packed 1 set in a box.

No. 77A

Has 16 gauges, marked to indicate radii from 1/32 to 17/64ths inch by 64ths.

No. 77A, with Leatherette Case................each **$4.00**

No. 77B

Has 8 gauges, marked to indicate radii from 9/32 to 1/2 inch by 32nds.

No. 77B, with Leatherette Case................each **$2.50**

No. 77C

Has 24 gauges, marked to indicate radii from 1/32 to 17/64ths inch by 64ths and from 9/32 to 1/2 inch by 32nds.

No. 77C, with Leatherette Case................each **$6.50**

No. 77D

Has 16 gauges, marked to indicate radii from 1/32 to 1/2 inch by 32nds.

No. 77D, with Leatherette Case................each **$4.50**

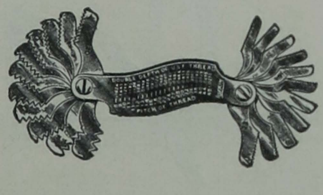
Extra Gauges for Above Sets

From 1/32 to 17/64ths inch..........................each **$.40**
From 9/32 to 1/2 inch.............................each **.45**

No. 20 Holders Only for Radius Gauge

No. 20...each **$.75**

Lufkin No. 73 Screw Pitch Gages



Designed to measure the pitch or number of threads per inch, of both U. S. form thread and the sharp V thread.

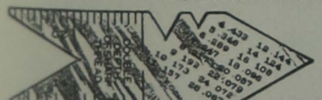
Each blade is marked with its pitch and on the outside of the case, the double depth of the U. S. form thread is given. To obtain the double depth of sharp V threads, for the same pitch, add one-third to the double depth given for U. S. form thread.

Blades are shaped to measure quickly the inside threads of nuts, as well as bolts and screws.

Packed 1 in a box; 6 in a carton.

No.	Each	Pitches	Weight Ounces
73A	**$1.25**	8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 24, 27, 28, 30, 32, 36, 38, 40, 44, 48	1
73B	**1.50**	4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 24, 27, 28, 30, 32, 36	1
73C	**1.75**	8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 24, 27, 28, 30, 32, 36, 38, 40, 44, 48, 50, 56, 60, 64, 72, 80	2
73D	**1.75**	3, 3¼, 3½, 4, 4½, 5, 5½, 6, 7, 8, 9, 10, 11, 11½, 12, 13, 14, 16, 18, 20, 22, 24, 27, 28, 30, 32, 36, 38	2

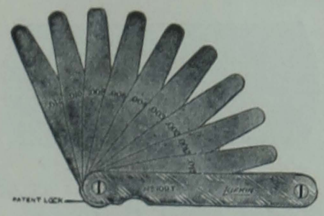
Lufkin Center Gauges



Marked 14ths, 20ths, 24ths and 32nds of an inch for measuring the number of threads to the inch.

No. **36**, Spring Tempered, 60° Angles............each **$.50**
No. **036**, Not Tempered, 60° Angles..............each **.40**
No. **37**, Whitworth, Tempered, 55° Angles.......each **.50**
No. **037**, Whitworth, Not Tempered, 55° Angles..each **.40**

Lufkin Thickness Gauges

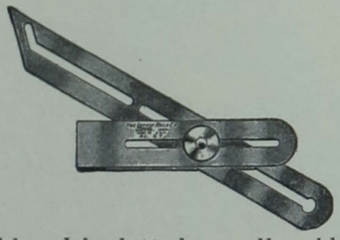


The tapered leaf patterns give access to narrow openings. All have regular case into which the leaves fold. They also have patent lock nut, making possible the locking of any leaf in any position, which is always convenient, and valuable in some classes of work.

Leaves, 3 inches long, tapered to 1/4-inch. Overall length of gauge with leaf extended and locked, 6 inches. Weight, one ounce.

No.	Thickness Leaves, Inches	Price Each
109T	.0015, .002, .003, .004, .006, .008, .010, .012, .015	**$1.50**
110T	.0015, .002, .0025, .003, .004, .006, .008, .010, .012, .015	**1.75**

No. 67 Lufkin Universal Bevels



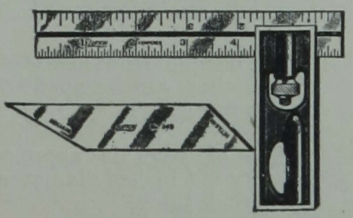
The stock of bevel is slotted as well as blade giving the finer adjustments. Head of clamping bolt sets into a recess, allowing stock to lie flat on work. 3½-inch stock, 6-inch blade. Can be used with No. 893 Lufkin Steel Protractor as a bevel protractor.

Packed 1 in a box.

No. **67** Universal Bevels..........................each **$2.25**

No. 26 Lufkin Double Squares

Tempered Blades

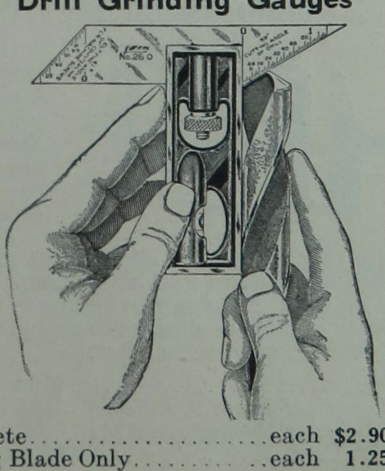


No. 26B, has graduated blade and bevel blade (this is the standard set); No. 26C, has graduated blade, bevel blade and drill grinding blade; No. 26A, has graduated blade only. Has No. 4 graduation; blade marked 8ths, 16ths, 32nds and 64ths inch. One in a box.

	Price, Each						
	Squares, Complete			Separate Parts			
Lgth. In.	No. 26B	No. 26C	No. 26A	Graduated Blade	Bevel Blade	Drill Grinding Blade	Stock
4	**$2.35**	....	**$1.85**	**$.80**	**$.50**	....	**$1.05**
6	**3.45**	**$4.70**	**2.85**	**1.20**	**.60**	**$1.25**	**1.65**

No. 26D Lufkin Drill Grinding Gauges

Tempered Blade



The 2 beveled ends of blade are graduated to 64ths of an inch and have readable numbering, as on steel rules. The beveled ends are 59 degrees, the cutting angle of drills, and 41 degrees, the cutting angle of countersinks.

This drill grinding blade fits the head of No. 26 six and nine-inch double squares.

Packed 1 in a box.

No. **26D**, Gauge Complete..........................each **$2.90**
No. **26E**, Drill Grinding Blade Only..............each **1.25**

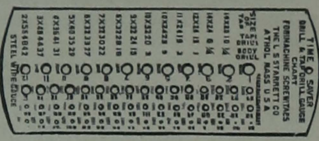
No. 286 Starrett Drill and Steel Wire Gauges

61 62 63 64 65 66 67 68 69 70
.039 .038 .037 .036 .035 .033 .032 .031 .0292 .028
No286
THE L.S.STARRETT CO. ATHOL MASS.U.S.A.
.026 .025 .024 .0225 .021 .020 .018 .016 .0145 .0135
71 72 73 74 75 76 77 78 79 80

Gives number and decimal equivalents of standard sizes from 61 to 80 inclusive. Adapted to gauge small twist drills and fine drill rods. Is 1/16 inch thick, 3/4 inch wide and 2 inches long.

Price, No. 286 ....each **$2.40**

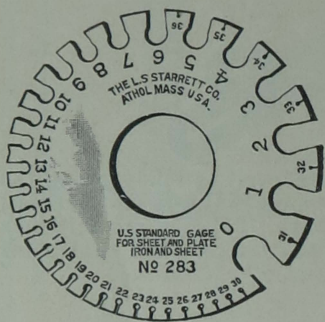
No. 185 Starrett Tap and Drill Gauges



Approximately 5/64 inch thick, 2 5/16 inches wide and 6 1/4 inches long. Enables one to select at once right sized drill to suit machine screw taps most commonly used.

Price, No. 185 ....each **$2.40**

No. 283 Starrett United States Standard Gages


THE L.S.STARRETT CO. ATHOL MASS U.S.A.
U.S STANDARD GAGE FOR SHEET AND PLATE IRON AND SHEET
No 283

For sheet and plate iron and steel.

Size of gage is approximately 3 1/4 inches in diameter by 1/8 inch thick.

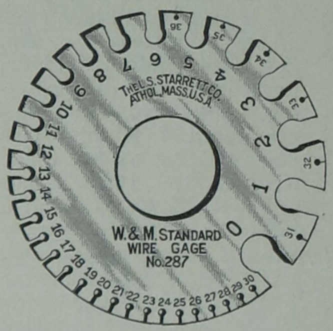
The decimal equivalents of each number are stamped on the back.

Each gage has black finish and is carefully tested after hardening.

Numbers 0 to 36.

No. 283 ....each **$3.00**

No. 287 Starrett Wire Gages


THE L.S.STARRETT CO. ATHOL, MASS. U.S.A.
W.& M. STANDARD WIRE GAGE No.287

Washburn & Moen standard.

The decimal equivalents of the numbers are stamped on the back.

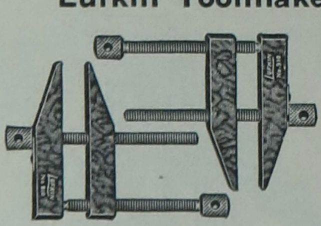
Size of gage is approximately 3 1/4 inches diameter by 1/8-inch thick.

Each gage has the black finish and is carefully tested after hardening.

Numbers 0 to 36.

No. 287 ....each **$3.00**

Lufkin Toolmaker's Parallel Clamps

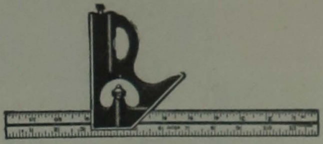


Useful in holding small work together, in drilling, tapping, etc. The rounded jaws permit clamping under shoulders or in a recess. They are made of steel, case hardened and designed to give great strength and rigidity. The threads of the screw are proportioned to allow a fast movement of the jaws as well as to insure a positive clamp. Clip attachment is flush with back of the jaw to eliminate interference with fingers when opening or closing the clamp.

Packed one pair in a box.

No.	910A	910B	910C	910D	910E
Length of Jaws......inches	1 5/8	2	2 1/2	3	4
Clamping Capacity..inches	3/4	1 1/4	1 3/4	2 1/4	2 3/4
Per Pair	$1.40	1.70	2.00	2.40	3.00

Lufkin Combination Squares



Tempered blade. Square head fitted with scriber and level in all sizes except 4-inch. No. 4 graduation: 8-16-32-64ths. Can be furnished No. 7 graduation: 16-32-64-100ths. One in box.

No. 25—Cast Head

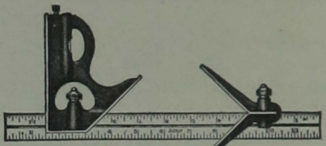
Length......in.	4	6	9	12
Each	$1.50	1.80	2.40	3.00

No. 35

Drop Forged and Hardened Square Head

Length......in.	4	6	9	12	18	24
Each	$2.30	3.10	3.40	4.30	5.40	6.30

Lufkin Combination Squares



Tempered blade with square and center heads. All square heads except 4-inch with level. No. 4 graduation: 8-16-32-64ths. No. 7 can be furnished: 16-32-64-100ths.

Packed one in a box.

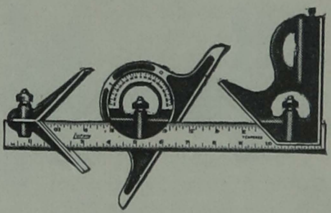
No. 25C—Cast Heads

Length......inches	4	6	9	12
Each	$2.10	2.40	3.00	3.60

No. 35C—Hardened Drop Forge Heads

Length......inches	4	6	9	12	18	24
Each	$3.80	4.60	5.30	6.20	7.30	8.20

Lufkin Combination Sets



Tempered blade with square, center and protractor heads. All square and protractor heads with level. No. 4 graduation: 8-16-32-64ths. No. 7 can be furnished: 16-32-64-100ths.

Packed one in a box.

No. 525—Cast Heads

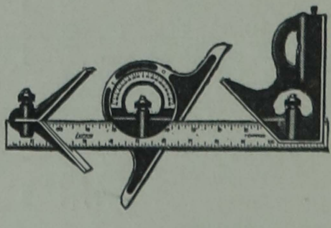
Length......inches	9	12	18	24
Each	$6.00	6.60	7.50	8.40

No. 625—Cast Heads

With Reversible Protractor Head

Length......inches	9	12	18	24
Each	$7.20	7.80	8.70	9.60

Lufkin Combination Sets



Tempered blade with square, center and protractor heads. Square and center heads are drop forged and hardened. All square and protractor heads with level. No. 4 graduation: 8-16-32-64ths. No. 7 can be furnished: 16-32-64-100ths.

Packed one in a box.

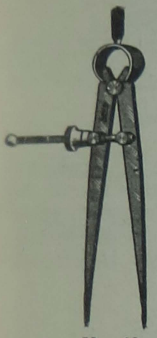
No. 535

Length......in.	9	12	18	24
Each	$8.30	9.20	10.30	11.20

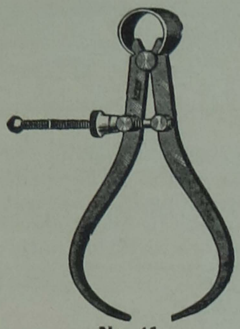
No. 635 With Reversible Protractor Head

Length......in.	9	12	18	24
Each	$9.50	10.40	11.50	12.40

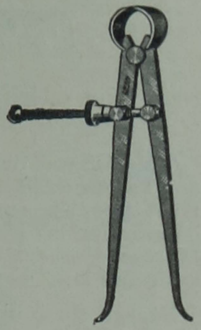
Lufkin Banner Dividers and Calipers



No. 40
Dividers



No. 41
Outside Calipers

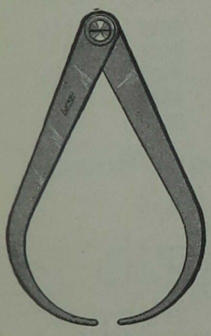


No. 42
Inside Calipers

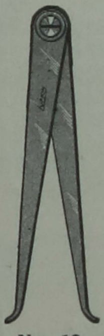
Made of high quality steel. They are light, but have the required stiffness they should have. Correct in shape and size. Supplied with heavy bow spring.

	Price, Each					
	With Solid Nut			With Quick Nut		
Size In.	No. 40 Dividers	No. 41 Outside	No. 42 Inside	No. 50 Dividers	No. 51 Outside	No. 52 Inside
2½	$.80	$.80	$.80	$1.00	$1.00	$1.00
3	.85	.85	.85	1.05	1.05	1.05
4	.90	.90	.90	1.10	1.10	1.10
5	1.00	1.00	1.00	1.15	1.15	1.15
6	1.05	1.05	1.05	1.20	1.20	1.20
8	1.35	1.20	1.20	1.50	1.40	1.40

Lufkin Firm Joint Outside and Inside Calipers



No. 11
Outside Caliper



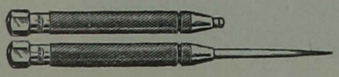
No. 12
Inside Caliper

Has an adjustable joint. Lock screw construction enables one to set and hold the legs to any desired tension or friction. All sizes below refer to lengths of legs.

Size In.	Price Each	Size In.	Price Each	Size In.	Price Each	Size In.	Price Each
3	$.50	8	$1.00	16	$2.10	*30	$6.00
4	.60	10	1.10	18	2.55	*36	7.20
5	.70	12	1.20	20	3.00	...	....
6	.80	14	1.80	24	3.60	...	....

*These two sizes made in the outside pattern only.

Lufkin Pocket Scribers



Made of steel tubing, knurled and nickel-plated. Illustration shows scriber open for use and closed, the points being removed and inserted into handle when not in use. They are firmly held in place by a knurled chuck. Points are of best quality steel, properly tempered, and shank is designed to be solidly held in handle when in use.

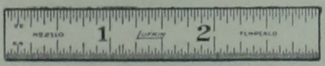
The hexagon head prevents rolling.

Packed 6 in a box.

No.		87A	87B
Scribers Complete	each	$.35	$.50
Extra Scriber Points	each	.15	.15
Diameter of Handle	inches	¼	⅜
Length of Point	inches	2⅜	2⅞
Weight, Each	ounces	½	1¼

Lufkin Flexible Rules

Machine Divided



Finest quality spring tempered steel, thin and flexible. Rules 12-inch and under are ½ inch wide, 18-inch and over are ¾ inch wide and heavier. Graduated, one side only. No. 2110 has No. 10 graduation, 32nds and 64ths; No. 2111R, No. 11, 64ths and 100ths; No. 2112, No. 12, 50ths and 100ths. Nos. 2111R and 2112 made in 6 and 12-inch only.

Packed: 12-inch and under, 6 in a box; others, one in a package.

Lgth. In.	Each	Wt., Lbs. per Doz.	Lgth. In.	Each	Wt., Lbs. per Doz.	Lgth. In.	Each	Wt., Lbs. per Doz.
1	$.30	1/16	6	$.90	¼	24	$3.25	2¼
2	.45	1/16	9	1.35	½	36	7.00	3
3	.60	⅛	12	1.65	½	48	10.00	4½
4	.75	⅛	18	2.60	1½	..	.....	...

Metal bound leather cases with pocket clip for 6-inch rules can be furnished at 15 cents each.

No. 2110R Lufkin Flexible Steel Rules

Machine Divided

Made of spring tempered steel; about ½ inch wide. Made in the 6-inch length only.

Graduated in 16ths, 32nds and 64ths and on both sides of the rule. The 32nds and 64ths graduations are on the lower edge of each side and start from the same end. The 16th graduation is on the upper edge of the 32nds side. Both 32nds and 64ths have readable graduations.

Packed 6 in a box. Weight per dozen, ¼ pounds.

No. **2110R**	each	**$.90**
No. S2110R, Stainless Steel	each	**1.35**

No. S2110R is the same as the No. 2110R, except that it is made of stainless steel.

Metal bound leather cases with pocket clip for 6-inch rules can be furnished at 15 cents each.

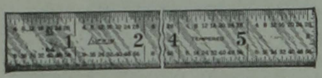
No. S2204R Lufkin Stainless Steel Rules

Machine Divided

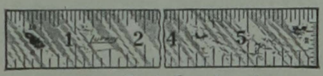
No. 4 graduation, 8ths, 16ths, 32nds and 64ths.

Length	inches	6	12
Width	inches	¾	1
Weight per Dozen	pounds	¾	2
Price, No. **S2204R**, Spring Tempered	each	**$1.35**	**2.65**

Lufkin Spring Tempered Rules



Showing Readable Graduation



Showing End Graduation

Rules 2 to 24 inches long have end graduation. Readable graduation can be supplied up to 48-inch length rules. Nos. 2204R and 2207R with readable graduations; No. 2204 without readable graduations.

Nos. 2204R and 2204 have No. 4 graduation.

No. 2207R has No. 7 graduation.

Approximate thickness, 3/64 inch.

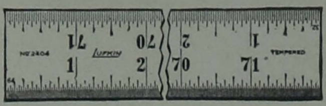
Rules 12 inches and under packed 6 in a box; others packed 1 in a package.

Lgth. In.	Each	Approx. Width In.	Wt., Lbs. per Doz.	Lgth. In.	Each	Approx. Width In.	Wt., Lbs. per Doz.
1	$.30	½	⅛	12	$1.65	1	2
2	.45	½	⅛	18	2.60	1¼	4½
3	.60	½	¼	24	3.25	1¼	6
4	.75	⅝	½	36	7.00	1¼	9
6	.90	¾	¾	48	10.00	1¼	12
9	1.35	⅞	1½	..	.....	...	..

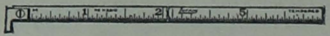
No. 2404 Lufkin Heavy Spring Tempered Steel Rules

Supplied with No. 4 graduation. Approximately 1/10-inch thick. Heavier than regular steel rules.

Length Inches	Approx. Width, In.	Price Each
36	1½	$7.00
48	1½	10.00
60	1½	20.00
72	1½	24.00



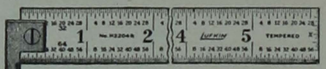
No. H2310 Lufkin Spring Tempered Narrow Hook Rules



Has No. 10 graduation. Interchangeable with blades of Lufkin Nos. 510 and 511. depth gauge. Can be used through holes ⅜ inch in diameter.

Lgth., In.	Price, Each	Lgth., In.	Price, Each
4	$1.00	9	$1.65
6	1.20	12	2.00

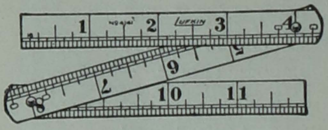
No. H2204R Lufkin Spring Tempered Hook Rules



No. 4 graduation; 6 to 24-in. lgths. have end graduation. Approx. thickness, 3/64-in. Rules 12-in. and under, 3 in box; others, 1 in pkg.

Length . . . . .in.	6	9	12	18	24	36
No. H2204R. . . . .each	$1.25	1.75	2.15	3.10	3.75	7.65
Approx. Width. . . .in.	¾	⅞	1	1¼	1¼	1¼

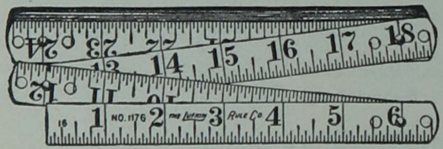
Lufkin Folding Steel Pocket Rules



Tempered steel, width ½-inch, semi-flexible. Sunken figures, lines clear cut, showing up in good contrast. Furnished with metal-bound leather cases only when specified. Marked one edge of both sides, one side 8ths, other side 16ths. Packed, Nos. 4141 and 4642, 12 in a box, all others six.

No.	Length Feet	Joints Inches	Wt. Lbs. per Doz.	Price, Each Without Cases	Price, Each With Cases
4141	1	4	½	$.90	$1.00
4142	2	4	1	1.50	1.60
4143	3	4	1½	2.30	2.40
4144	4	4	2¼	3.00	3.10
4642	2	6	1	1.40	1.55
4643	3	6	1½	2.20	2.35
4644	4	6	2¼	3.00	3.15

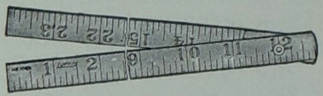
Lufkin Folding Steel Rules



No.	Length Feet	Each
1172	2	$1.30
1173	3	2.00
1174	4	2.60
1175	5	3.30
1176	6	3.90
1178	8	5.40

Marked both sides inches and 16ths.

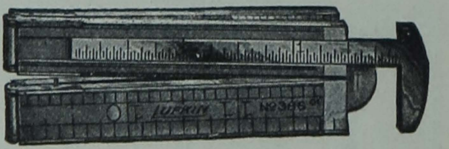
No. 1085 Lufkin Folding Brass Rules



For blacksmiths and metal workers. Made of hard brass, 9/16 inch wide. Marked on one edge, one side inches to eighths, the other side 16ths. Two foot, 12-inch sections. Stop joint. Twelve in a box.

No. **1085**. . . . . .each **$1.00**

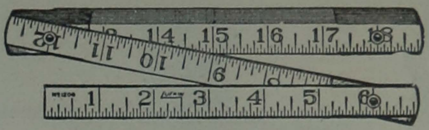
Lufkin Boxwood Caliper Rules



Arch joint. Graduated in 8ths, 10ths, 12ths, and 16ths. Caliper, 16–32nds. One foot, 4 fold, 1 inch wide. 6 in box.

No. **386** (32), Edge Plates, Wt., 1½ Lbs. . . . .per doz. **$12.20**
No. **388** (32½), Full Bound, Wt., 1¾ Lbs. . .per doz. **17.50**

Lufkin Aluminum Rules

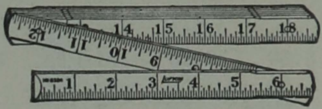


This rule is rust-proof throughout, being of aluminum and having solid brass joints. The spring joints are of the rivet type. The surface of rule is in natural color, with sunken graduations and figures in black showing up distinctly. Marked consecutive inches to 16ths, both sides. Has 6-inch folds and is 9/16 inch wide.

Packed three in a box.

No.	Length Feet	Wt. Lbs. per Doz.	Price per Doz.	No.	Length Feet	Wt. Lbs. per Doz.	Price per Doz.
1204	4	3¼	$9.50	1206	6	5	$14.20
1205	5	4¼	12.00	. . .			. . . . .

Lufkin Flexible Spring Joint Rules



Marked in consecutive inches to 16ths, both sides. Rivet joints. Brass trim.

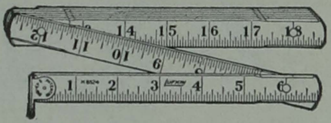
Packed: 3-foot lengths, 12 in box; 4 to 8-foot, 6 in box.

Length Feet	Cream Enameled No.	Cream Enameled Wt., Lbs. per Doz.	Cream Enameled Per Dozen	White Enameled No.	White Enameled Wt., Lbs. per Doz.	White Enameled Per Dozen
3	8523	1½	$2.50	8623	1½	$2.95
4	8524	2	3.40	8624	2	3.60
5	8525	2½	4.20	8625	2½	4.80
6	8526	3	4.80	8626	3	5.40
8	8528	4	6.60	8628	4	7.20

Lufkin Spring Joint Rules

With Folding Hook

Rivet Joints

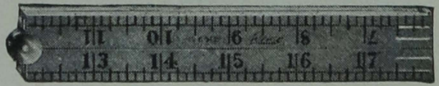


Showing Hook Open

White enameled. This rule is flexible and has 6-inch folds. It is ⅝ inch wide. Has folding hook.

No.	Length Feet	No. in Box	Weight Pounds per Dozen	Price per Dozen
H8625	5	6	2½	$5.40
H8626	6	6	3	6.00
H8628	8	6	4	7.80

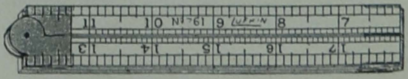
No. 651 Lufkin Boxwood Rules



Round joint. graduated in 8ths and 16ths. Two foot, fourfold, 1 inch wide. Middle plates with heavy, clear and distinct figures. Unbound. Twelve in a box; weight, 1¼ pounds.

No. **651** **(68)**. . . . . .per dozen **$2.50**

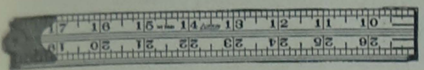
No. 761 Lufkin Boxwood Rules



Has drafting scales, square joint and edge plates; unbound. Made fourfold, graduated 8, 10, 12 and 16 inches. Length 2 feet; width 1 inch. Packed 6 in a box. Weight 1½ pounds per dozen.

No. **761**. . . . . .each **$7.40**

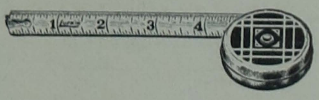
Lufkin Boxwood Rules



Arch joint. Graduated in 8ths and 16ths inch. Three-foot,. 4-fold. Unbound. One inch wide. Packed 6 in a box. Weight, per dozen, 2 pounds.

No. **3851** (66½), with Middle Plates.......per dozen **$8.00**
No. **3861** (66¼), with Edge Plates.........per dozen **10.10**

No. 186 Lufkin Aristocrat Tape-Rules



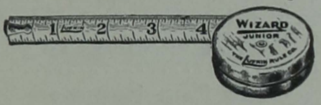
Marked one side only. Steel line can be projected unsupported like a rule to walls or into openings. Will also flex around and accurately measure circles, etc. Hook at first end is ideal for hooking over objects.

Stainless steel case 1⅝ inches in diameter; both sides have embossed design with background in black enamel.

Packed one in a box; 3 in a carton. Weight, 2 ounces.

No. **186**, 72-Inch, Marked Consecutive Inches to 16ths on both edges (First 6 inches on upper edge to 32nds).ea. **$1.50**
No. **186D**, 6-Ft., Upper Edge, Marked Ft., 10ths and 100ths of Ft.; Lower Edge, Ft., In. and 16ths...each **1.75**

Lufkin Wizard Junior Tape-Rules



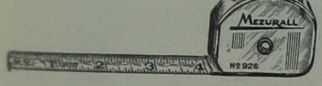
Nickel plated steel blade is stiffened by concave forming so it can be projected unsupported; will also flex to measure circles, around corners, etc. Blade is manually withdrawn and returned. Remains set at any length withdrawn. Solid hook is for measuring within or beyond arm's reach. Accurate butt end measurement is taken from shoulder of blade.

Nickel plated case, 2 inches in diameter, encloses blade. Has rounded corners and is ribbed at bottom.

Marked one side inches to 16ths both edges; first 6 inches of upper edge to 32nds.

No.	**1686**	**1688**
Per Dozen	**$9.00**	**15.00**
Length.....inches	72	96

No. 926 Lufkin Mezurall Tape Rules



This tape rule is for all measurements; inside and outside; height and depth gage; flexible and rigid measurements. Compact and light weight.

The nickel-plated, ½ inch wide blade is manually operated. The blade remains set at any length withdrawn—will not spring back into case.

Adjustable end hook. Allows accurate measurements, either hook or butt end, a feature not possible with a tape rule having a solid, or fixed hook. The case is nickel-plated; 2 inches wide, fully enclosing blade. Case will stand unsupported in three measuring positions.

Blade marked in inches to 16ths; first 6 inches upper edge to 32nds. Weight, 3 ounces. Length blade, 72 inches.

No. **926**, Blade Marked 1 Side, Both Edges.....each **$1.00**
No. **926B**, Blade Marked Both Sides, Both Edges.each **1.25**

Lufkin Universal Ass Skin Tapes

Tape ½ in. wide, cotton is coated, marked in ft., inches and quarter inches. Packed 1 in a box, 6 in carton.

No.	Lgth. Ft.	Price per Dozen	No.	Lgth. Ft.	Price per Dozen
710	25	**$5.40**	**714**	66	**$8.90**
711	33	**5.90**	**715**	75	**10.70**
713	50	**7.10**	**716**	100	**14.20**

Lufkin Challenge Steel Tapes

THE LUFKIN RULE CO.
CHALLENGE STEEL TAPE
50 FT

Has Nubian finished ⅜-inch steel tape. Metal lined genuine leather case, nickel-plated trimmings, folding flush handle. Measurements guaranteed accurate.

Nos. 260 to 266 are marked in feet, inches and eighths. Nos. 260D to 266D are marked in feet, 10ths and 100ths, one side only.

Packed one in a box.

No.	Length Feet	Price Each	No.	Length Feet	Price Each
260 and **260**D	25	**$4.90**	**264** and **264**D	66	**$7.50**
261 and **261**D	33	**5.30**	**265** and **265**D	75	**7.80**
263 and **263**D	50	**6.00**	**266** and **266**D	100	**10.20**

Lufkin Challenge Junior Steel Tapes

THE LUFKIN RULE CO.
CHALLENGE JR STEEL TAPE

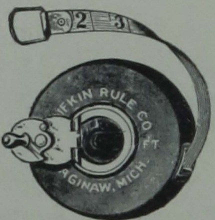
Tape is ¼ inch wide.

Genuine leather cases; nickel-plated trimmings and folding flush handle.

Nos. 1260 and 1263 are marked in feet, inches and 16ths; Nos. 1260D and 1263D are marked in feet, 10ths and 100ths, one side only. Packed one in a box.

No.	**1260**	**1263**	**1260D**	**1263D**
Length.....feet	25	50	25	50
Weight, Each.....ounces	4	7	4	7
Each	**$4.70**	**5.70**	**4.70**	**5.70**

Lufkin Metallic Tapes

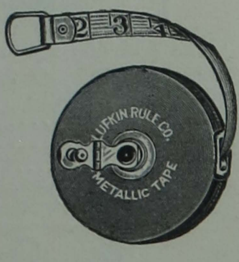


Line is of linen with metallic warp. First end has leather reinforcement. Case is brown genuine leather, hand-stitched with plated steel liner. Winding handle, double-folding flush pattern, is opened by pressing pin on opposite side. Mountings nickel plated. Patent threader.

Nos. 600 to 606 are marked in feet and inches; Nos. 600D to 606D, in feet, 10ths and half 10ths. Width ⅝ inch.

No.	**600** **600D**	**601** **601D**	**603** **603D**	**604** **604D**	**605** **605D**	**606** **606D**
Each	**$5.20**	**5.80**	**6.70**	**7.40**	**7.90**	**9.60**
Length.....feet	25	33	50	66	75	100
Weight Each.oz.	10	11	15	18	21	25

Lufkin Metallic Tapes



Tape is ⅝ inch wide, of linen with metallic warp and leather reinforcement first end. Marked clearly and with prominent figures.

Case is of genuine leather, hand-stitched, with metal liner and a substantial folding handle. Trimmings, nickel-plated.

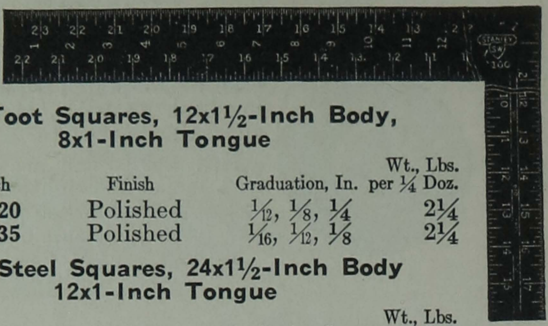
Patent threader which makes the removal of an old and attaching of a new line a simple operation.

Marked feet, inches, and half inches, one side only.

Packed 1 in a box.

No.	Each	Length Feet	Wt., Oz. Each	No.	Each	Length Feet	Wt., Oz. Each
500	**$3.50**	25	9	**505**	**$6.30**	75	21
503	**5.00**	50	15	**506**	**7.90**	100	24

Stanley Steel Squares



1-Foot Squares, 12x1½-Inch Body, 8x1-Inch Tongue

No.	Each	Finish	Graduation, In.	Wt., Lbs. per ¼ Doz.
10	$1.20	Polished	1/12, 1/8, 1/4	2¼
12	1.35	Polished	1/16, 1/12, 1/8	2¼

Flat Steel Squares, 24x1½-Inch Body 12x1-Inch Tongue

No.	Each	Finish	Graduation, In.	Wt., Lbs. per ½ Doz.
F2	$.55	Polished	1/8, 1/4	7¾

Flat Steel Squares, 24x2-Inch Body 12x1½-Inch Tongue

No.	Each	Finish	Graduation, In.	Wt., Lbs. per ½ Doz.
F4	$.75	Polished	1/8, 1/4	10¼

Rafter or Framing Squares, 24x2-Inch Body, 16x1½-Inch Tongue

Rafter or Framing, Brace, Octagon, Essex Board Measure and 100ths Scale

No.	Each	Finish	Graduation, In.	Wt., Lbs. per ¼ Doz.
R100	$2.45	Polished	1/32, 1/16, 1/12, 1/10, 1/8	6¼
R100B	3.05	Blued	1/32, 1/16, 1/12, 1/10, 1/8	6¼
R100C	3.45	Royal Copper	1/32, 1/16, 1/12, 1/10, 1/8	6¼
Rafter or Framing, Brace and Essex Board Measure				
R3	$1.90	Polished	1/16, 1/12, 1/4	6¼

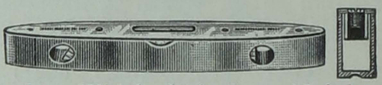
2-Foot Squares, 24x2-Inch Body, 16x1½-Inch Tongue

No.	Each	Finish	Graduation, In.	Wt., Lbs. per ¼ Doz.
Brace, Octagon and Essex Board Measure and 100ths Scale				
100	$1.90	Polished	1/32, 1/16, 1/12, 1/10, 1/8	6¼
100B	2.50	Blued	1/32, 1/16, 1/12, 1/10, 1/8	6¼
100C	2.90	Royal Copper	1/32, 1/16, 1/12, 1/10, 1/8	6¼
Brace and Essex Board Measures				
3	$1.75	Polished	1/16, 1/12, 1/4	6¼
3B	2.35	Blued	1/16, 1/12, 1/4	6¼
Essex Board Measure				
14	$1.55	Polished	1/8, 1/4	6¼
14B	2.15	Blued	1/8, 1/4	6¼

18-Inch Squares, 18x1½-Inch Body, 12x1-Inch Tongue

No.	Each	Finish	Graduation, In.	Wt., Lbs. per ¼ Doz.
18	$1.55	Polished	1/16, 1/12, 1/8	3¼
18B	2.15	Blued	1/16, 1/12, 1/8	3¼

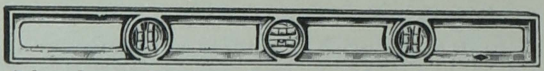
No. 26E Empire Aluminum Torpedo Levels



Length, 9 inches. Width, ⅝ inches. Height, 1¼ inches. Packed 6 in a counter display box. Weight, 4 ounces.

No. **26E**....................................each **$2.00**

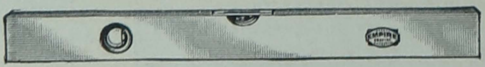
No. 156 Empire Aluminum Levels



Has 2 levels, 4 plumbs; aluminum alloy frame. Solid set vials, covered by protecting glasses. Precision machined edges, black trim.

Size....................inches	24	28
Each	**$3.20**	**4.00**
Weight....................pounds	1¾	2

No. 200 Empire Wood Levels



Has 1 level, 1 plumb. Enameled red. Aluminum trimming. Packed one in a carton.

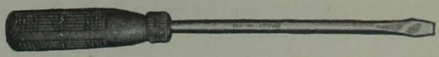
Size....................inches	18	24
Each	**$1.25**	**1.40**
Weight....................pounds	¾	1⅛

Stanley Non-Sparking Tools

Made from Anaconda Wrought Beryllium Copper

Designed for lacquering plants, producers and processors of cellulose nitrate, oil companies, public utilities and others confronted with explosion and fire hazards in their maintenance and production work. They are non-magnetic and non-sparking and are almost as durable as steel tools of similar design and size.

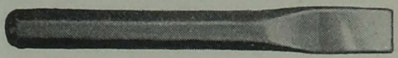
Screw Drivers



Blade securely anchored in moulded rubber composition handle. Standard style blade and tip.

No.	Each	Blade In.	Diam. In.	Overall In.	Wt. Oz.
B30	$1.50	6	5/16	11	7
B31	2.00	8	3/8	13¾	9

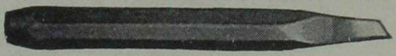
No. B15 Hand Cold Chisels



Bit ⅞ in.; stock ¾ in. octagon; length 7 in.; wt. 14½ oz.

No. B15....................................each **$4.50**

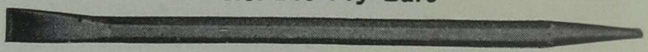
No. B18 Diamond Point Chisels



Point ½ in.; stock ¾ in. octagon; length 7 in.; wt. 14½ oz.

No. B18....................................each **$4.50**

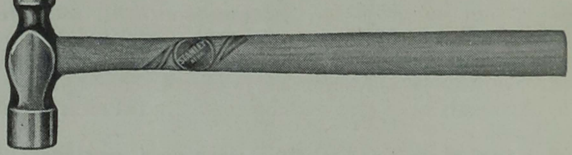
No. B68 Pry Bars



For opening man hole covers on tanks, and tank cars, or lining up holes. Size, ¾ in. octagon x 18 in.; wt. 2¼ lbs.

No. B68....................................each **$11.50**

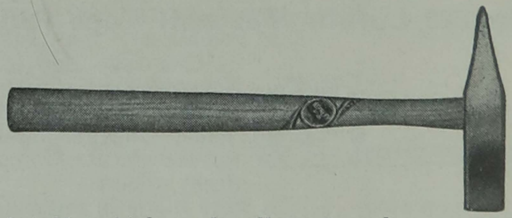
Ball Pein Hammers



Non-shrinking hickory handle. 2 wedges prevent loose head or handle. Safety green face, pein and cheek, copper color.

No.	Each	Head Oz.	Overall In.	Wt. Lbs.
B3	$13.10	24	16	2⅛
B4	16.40	32	16	2⅝

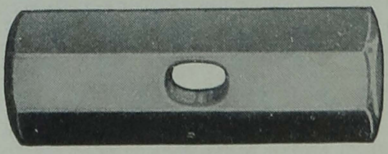
No. B7 Boiler Picks or Scaling Hammers



Non-shrinking hickory handle. 2 wedges prevent loose head or handle. Head 1 lb.; overall 13 in.; wt. 1½ lbs.

No. B7....................................each **$9.30**

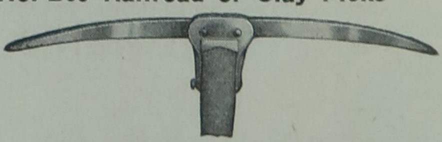
No. B10 Double Face Sledges With Handles



A 10-lb. octagon sledge for heavy work. Hickory handle processed to prevent shrinking. Head 2½x 6½ in.; overall 32 in.; wt. 10½ lbs.

No. B10....................................each **$60.00**

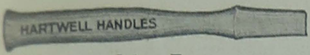
No. B69 Railroad or Clay Picks



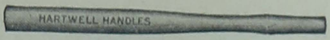
Eyeless pattern, non-shrinking handle; bronze head.

No. B69....................................each **$44.00**

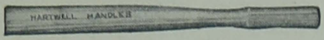
Hammer Handles



Adze Eye



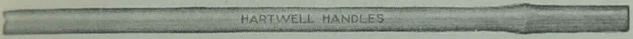
Machinist



Drill or Striking

Length Inches	Per Dozen	Brand	Dozens in Crate	Wt. per Crate, Lbs.
		Adze Eye		
14	$3.90	A.W.	1	5
		Machinists		
12	$3.90	A.W.	1	5
14	3.90	A.W.	1	5
16	4.30	A.W.	1	6
18	4.90	A.W.	1	7
		Drill or Striking		
16	$4.30	A.W.	1	6
18	3.90	A.R.	1	7

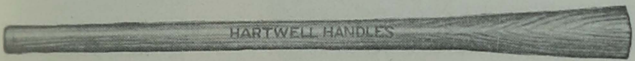
Sledge or Maul Handles



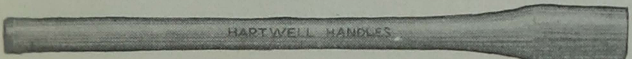
Length Inches	Per Dozen	Brand	Dozens in Crate	Wt. per Crate, Lbs.
24	$5.80	A.R.	2	24
30	9.60	A.R.	2	30
32	9.60	A.R.	2	30
34	10.60	A.R.	2	34
36	10.60	A.R.	2	36

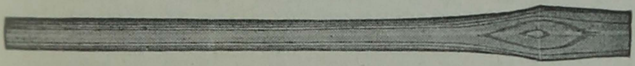
Pick Handles

Railroad

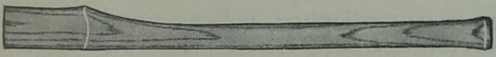


Length Inches	Per Dozen	Brand	Dozens in Crate	Wt. per Crate, Lbs.
36	$13.20	B.W.	2	60
		Drift		
34	15.20	A.R.	2	56
		Coal		
34	15.20	A.R.	2	56

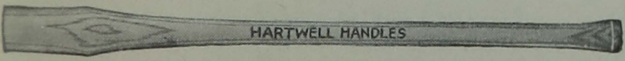




Axe Handles



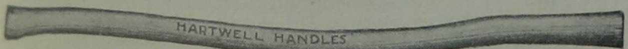
Single Bit



Double Bit

Length Inches	Per Dozen	Brand	Dozens in Crate	Wt. per Crate, Lbs.
		Miners' Single Bit		
28	$12.20	A.R.	2	30
		Single Bit		
36	12.20	A.R.	2	36
		Double Bit		
36	12.20	A.R.	2	36

Carpenters' or Railroad Adze Handles



Length Inches	Per Dozen	Brand	Dozens in Crate	Wt. per Crate, Lbs.
36	$12.60	A.R.	2	40

Federal Specifications for Handles

Grade AA handles shall not have more than 17 rings of annual growth per inch of radius, shall be of heavy weight, shall be free from all defects, and shall contain only all white hickory (sapwood).

Grade AAR handles shall not have more than 17 rings of annual growth per inch of radius, shall be of heavy weight, shall be free from all defects, and shall allow white hickory (sapwood), red hickory (heartwood), and/or mixed hickory (heartwood and sapwood).

Grade AW handles shall have not more than 22 rings of annual growth per inch of radius, shall be of at least medium weight, shall be free of all defects, and shall contain only all white hickory (sapwood).

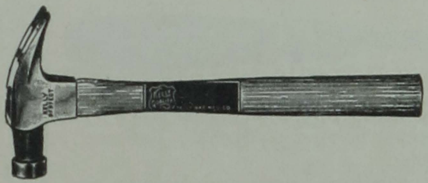
Grade AR handles shall have not more than 22 rings of annual growth per inch of radius, shall be of at least medium weight, shall be free of all defects, and shall allow white hickory (sapwood), red hickory (heartwood), and/or mixed hickory (heartwood and sapwood).

Grade BW handles shall have not more than 27 rings of annual growth per inch of radius, shall be of at least medium weight, shall contain only all white hickory (sapwood), and shall be free of all defects except as follows: (1) Slight iron streaks not exceeding four in number running the entire length of the handle or their equivalent in shorter lengths. (2) One sound, tight knot or bird peck not over ¼ inch in diameter located in the eye or in the first third of the handle from the grasp end, or two sound, tight knots or bird pecks the combined diameters of which do not exceed ¼ inch. (3) Slight deflection of grain not exceeding ⅛ inch out of parallel with the axis of the handle.

Grade BR handles shall be of the same quality as Grade BW handles and shall allow white hickory (sapwood), red hickory (heartwood), and/or mixed hickory (heartwood and sapwood).

Grade C handles shall be of at least fair weight (lightweight wood excluded) and shall include serviceable handles of white hickory (sapwood), red hickory (heartwood), and/or mixed hickory (heartwood and sapwood) containing defects that are not permitted in the higher grades.

Kelly Perfect Ripping Hammers



Forged, high grade steel. Hickory handles. Polished.

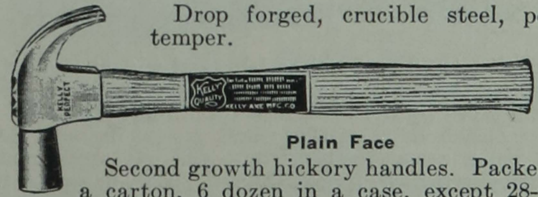
Packed 6 in a carton, 4 dozen in a case.

No.	Per Dozen	Size No.	Weight Head Ounces	Length Handle Inches
		Plain Face		
5801	$10.65	701	20	14½
5801½	9.00	701½	16	13½
		Bell Face		
5911	$10.65	711	20	14½
5911½	9.00	711½	16	13½
5912	8.65	712	13	13½

Kelly Perfect Adze Eye Nail Hammers

Plain or Bell Face, Polished

Drop forged, crucible steel, perfect temper.

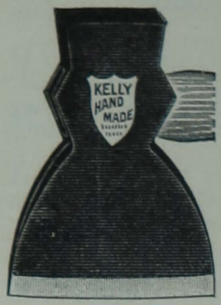

KELLY AXE MFG. CO.

Plain Face

Second growth hickory handles. Packed 6 in a carton, 6 dozen in a case, except 28-ounce which is packed 4 in a carton.

Plain Face			Bell Face				
No.	Size	Per Doz.	No.	Size	Per Doz.	Lgth. Hdle. Inches	Wt. Head Oz.
5000	0	$20.00	5111	11	$16.00	14½	20
5001	1	16.00	5111½	11½	13.50	13½	16
5001½	1½	13.50	5112	12	13.00	13½	13
5002	2	13.00	5113	13	12.50	12½	7
......	...	.....	5114	14	12.50	12½	5

Kelly Hand Made Broad Hatchets



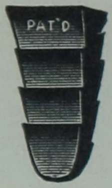
Black forged finish, cutting edge polished.

No. 2 hickory handles.

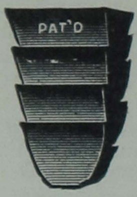
Packed six in a carton

No.	Size	Width Cut In.	Length Handle In.	Price per Dozen
1591	1	4	14	$12.00
1592	2	4½	15	19.00
1593	3	5	15	21.00
1594	4	5½	16	23.00

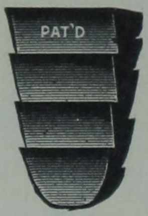
Grady Wedges



No. 2



No. 3



No. 4

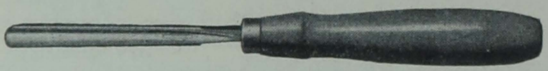
Scientifically designed for all sizes of hammers, hatchets, single and double bitted axes, etc.

Packed in bulk.

No.	2	3	4	15
Weight per Gross . . . . pounds	*10½	⅞	1¼	7⅛
Per Gross	$1.00	1.05	1.45	2.90

*Ounces.

Yates-American Turning Gouges



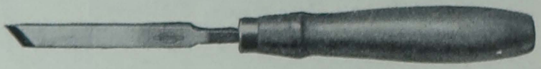
Turning gouge has a blade 8 inches long on sizes 1 inch and wider. The smaller sizes having a slightly reduced length to give added strength.

Fitted with 8-inch polished hardwood handle and reinforced by heavy cast ferrule, brass plated.

Size Inches	Per Dozen	Size Inches	Per Dozen	Size Inches	Per Dozen
⅛	$10.25	⅝	$10.75	1¼	$17.25
¼	10.25	¾	12.00	1½	21.25
⅜	10.25	⅞	13.25	1¾	24.50
½	10.25	1	14.25	2	29.00

For gouges without handles, deduct $2.75 per dozen from list above.

Yates-American Turning Chisels



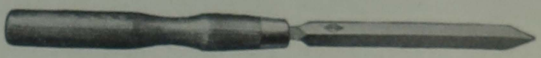
Blade length, 8 in. on sizes 1-in. and wider; smaller sizes slightly shorter. Fitted with 8-in. polished hardwood handle; reinforced by heavy cast ferrule, brass plated.

Stock chisels have cutting edges ground on both sides of blade, being a combination right and left skew, and will answer for ordinary turning. Round, spear, or square point, right skew, or left skew can be furnished at extra price.

Size Inches	Per Dozen	Size Inches	Per Dozen	Size Inches	Per Dozen
⅛	$8.75	⅜	$9.25	1¼	$12.50
¼	8.75	¾	9.75	1½	16.00
⅜	8.75	⅞	10.50	1¾	18.75
½	8.75	1	11.75	2	21.25

Chisels with special points list a $1.00 per dozen advance over regular. For chisels without handles, deduct $2.75 per dozen from list above.

Yates-American Parting Tools



This parting tool has a blade 7 inches long, and is fitted with a polished hardwood handle 8 inches long which is reinforced by a heavy cast ferrule, brass plated.

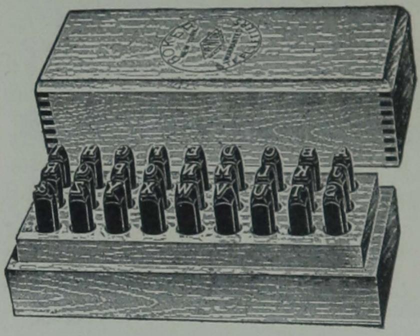
The blade is thin at the edge with a heavy section down the center.

Size . . . . in.	½	⅝	¾
Thickness of Point . . . . in.	5/32	3/16	7/32
Per Dozen	$6.00	6.50	7.00

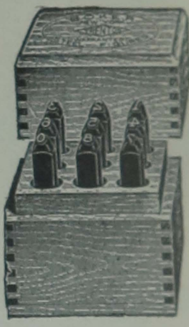
For parting tools without handles, deduct $2.75 per dozen from list above.

Boker Steel Letters and Figures

Machine Cut



Letters



Figures

Forged and cut from best quality crucible steel.

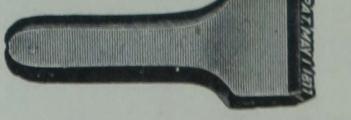
Warranted hard and tough, and to cut sharp and true.

Packed in wooden boxes as illustrated.

Size Inches	Steel Figures per Set	Steel Letters per Set	Single Figures and Letters Each	Size Inches	Steel Figures per Set	Steel Letters per Set	Single Figures and Letters Each
1/32	$2.50	$7.50	$.35	7/32	$2.25	$6.75	$.35
1/24	2.50	7.50	.35	¼	2.50	7.50	.35
1/20	2.00	6.00	.30	5/16	3.00	9.00	.40
1/16–⅛	1.50	4.50	.25	⅜	3.50	10.50	.50
5/32	1.75	5.25	.30	7/16	4.25	12.75	.55
3/16	2.00	6.00	.30	½	4.75	14.25	.65

Prices upon application for special hand-cut letters and figures, stamps or dies, branding irons, marking hammers, brass stencil, pattern letters, house numbers, brass letters for concrete work, etc.

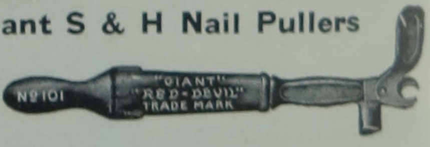
Steel Hand Stamps



In ordering steel stamps, specify size of letter or figure, also whether Gothic or Roman letters.

Prices on application.

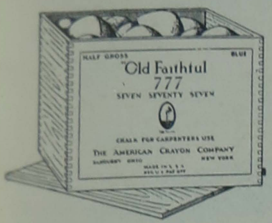
No. 101 Giant S & H Nail Pullers



Box chisel on back of tool cuts wooden or iron hoops at one stroke, releasing barrel heads intact. Radium rammer, polished jaw. Total length, 20 inches; rammer, 12 inches. Weight, 5 pounds. Packed 3 dozen in a case.

Price, No. 101 . . . . each $2.25

777 Carpenters' Chalks


HALF GROSS
BLUE
Old Faithful
777
SEVEN SEVENTY SEVEN
CHALK FOR CARPENTERS USE
THE AMERICAN CRAYON COMPANY
NEW YORK

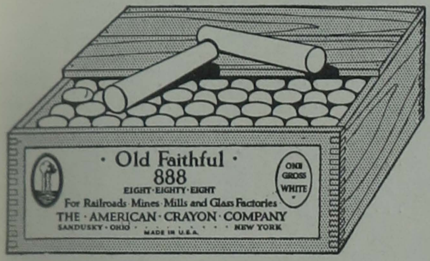
This chalk is made in hemispherical cakes in white, red or blue and is a high grade carpenter chalk.

It is used by many classes of tradesmen, such as carpenters, surveyors, paper hangers, machinists, etc., and is used largely for chalking lines, marking lumber, and also for laying out pattern work on metal.

Packed ½ gross in a strong, wooden lock-cornered box.

Price, No. **777** White.......................per gross **$2.30**
Price, No. **777** Red..........................per gross **2.80**
Price, No. **777** Blue.........................per gross **2.80**

American 888 Railroad Crayons


· Old Faithful ·
888
EIGHT · EIGHTY · EIGHT
For Railroads Mines Mills and Glass Factories
THE · AMERICAN · CRAYON · COMPANY
SANDUSKY · OHIO · NEW YORK
MADE IN U.S.A.
ONE GROSS WHITE

Made in large, substantial sticks which carry well in the pocket, size 4 inches long by 1-inch diameter.

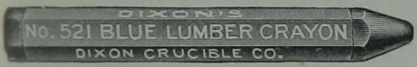
Makes bright, temporary marks.

Used by leading railroads, glass manufacturers, machinists, and coal miners.

Packed 1 gross in a strong, lock-cornered wood box.

No. **888**, White.............................per gross **$2.60**
No. **888**, Red...............................per gross **3.00**
No. **888**, Blue..............................per gross **3.00**
No. **888**, Green.............................per gross **3.50**

Dixon's Lumber Crayons


DIXON'S
No. 521 BLUE LUMBER CRAYON
DIXON CRUCIBLE CO.

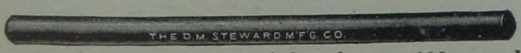
Size, 4½x½ inch. Packed 1 dozen in a box.

No.	Per Gross	Color	Grade
361	**$8.00**	Black (Graphite)	Medium
365	**8.00**	Black (Graphite)	Very Soft
365½	**8.00**	Black (Graphite)	Soft
485-S	**48.00**	Purple (Indelible)	Soft
485-H	**48.00**	Purple (Indelible)	Hard
492	**14.40**	Pink	Regular
494	**14.40**	Carbon Black	Regular
495	**14.40**	Brown	Regular
496	**14.40**	Yellow	Regular
497	**14.40**	Terra Cotta	Regular
520	**14.40**	Red	Regular
520½	**14.40**	Red	Soft
521	**14.40**	Blue	Regular
521½	**14.40**	Blue	Soft
522	**14.40**	Green	Regular
523	**14.40**	White	Regular

Genuine Soapstone Pencils

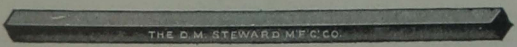
Made from high grade material, carefully selected. Very strong and durable. Packed 1 gross to box; 24 gross to case.

Round


THE D. M. STEWARD M'F'G CO.

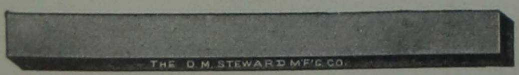
Dimensions, 5x¼ inches. Weight of case, 130 pounds.
Per Gross.. **$5.50**

Square


THE D. M. STEWARD M'F'G CO.

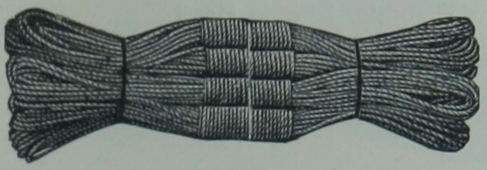
Dimensions, 5x¼x¼ inches. Weight of case, 135 pounds.
Per Gross.. **$4.50**

Flat


THE D. M. STEWARD M'F'G CO.

Dimensions, 5x½x3/16 inches. Weight of case, 217 pounds.
Per Gross.. **$5.00**

Masons' Lines
In Hanks

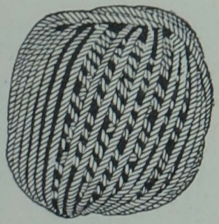


One hundred feet in a hank.

No.	Thread	Price per Dozen
4	18	**$2.50**
6	24	**3.00**

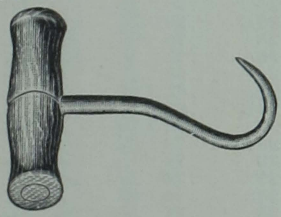
Twisted Cotton Chalk Lines

In Balls



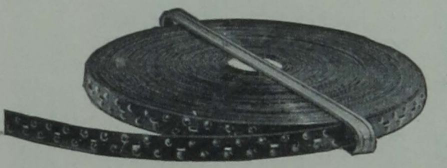
No.	Ball Size Feet	Price per Dozen
11	50	**$3.00**
13	100	**6.00**

Cotton Hooks



Price........per dozen ......

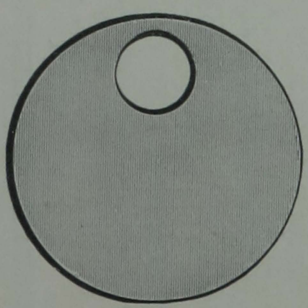
Acme Nailezy Embossed Box Strapping



Properly applied box strapping prevents pilferage, insures package security, and permits reduction in the thickness of container materials. Combines qualities of unusual strength with ease in application.

Width Inches	Coils per Case	300-foot Coils Price per Coil	Large Coils No. of Feet	Large Coils Price per Coil
⅜	20	**$.90**	4000	**$12.00**
½	20	**1.00**	3000	**10.00**
⅝	20	**1.25**	3000	**12.50**
¾	20	**1.50**	2000	**10.00**
⅞	10	**1.75**	2000	**11.66**
1	10	**2.00**	1500	**10.00**

Brass and Steel Miners' Checks



Brass

Diameter, 1⅜ inches. Hole, ⅜ inch. Thickness, .036 inches.

Approximately 64 in a pound.

Per 1000.............. **$20.00**

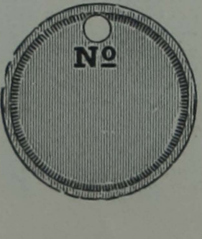
Steel

Diameter, 1¾ inches. Hole, ⅝ inch. 20 gage.

Approximately 40 in a pound.

Per 1000.............. **$6.00**

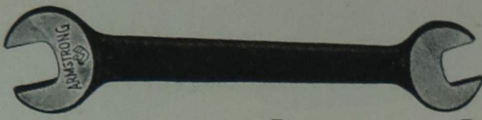
Round Brass Tool Room Checks



No.	Diam. In.	Description	Approx. No. to Lb.	Price per 100
1	⅞	⅛-inch Hole	124	....
3	1⅜	⅝ " Slot	68	....
7	1⅛	⅛ " Hole	94	....
8	1⅛	No Hole	92	....
12	1⅜	5/32-inch Hole	62	....

Armstrong Drop Forged Carbon Steel Engineers' Wrenches

15° Angle, Double Head



No.	Each	Openings Milled In.	For U.S. Std. Nuts; Size Bolts In.	For Amer. Std. Nuts; Reg. and Fin. Size Bolts In.	For Hex. Head Cap-Screws; Diam. Screws In.	For S.A.E. Std. Nut and Cap Screws; Size Bolts In.	Extreme Lgth. In.
21A	$.34	5/16 - 3/8	1/8	....	1/8- 3/16	....	4 1/8
21	.34	5/16 - 13/32	1/8- 3/16	....	1/8	....	4 1/8
22A	.42	5/16 - 7/16	1/8	1/4	1/8- 1/4	1/4	4 1/2
22	.42	5/16 - 1/2	1/8- 1/4	....	1/8- 5/16	5/16	4 1/2
23A	.42	3/8 - 7/16	....	1/4	3/16- 1/4	1/4	4 1/2
23B	.42	3/8 - 1/2	1/4	....	3/16- 5/16	5/16	4 3/4
23	.42	13/32- 1/2	3/16- 1/4	....	5/16	5/16	4 3/4
24A	.50	3/8 - 9/16	....	5/16	3/16- 3/8	3/8	5
24	.50	13/32- 19/32	3/16- 5/16	....	....	....	5
25A	.50	7/16 - 1/2	1/4	1/4	1/4- 5/16	1/4- 5/16	5
25B	.50	7/16 - 9/16	....	1/4-5/16	1/4- 3/8	1/4- 3/8	5
25C	.50	1/2 - 9/16	1/4	5/16	5/16- 3/8	5/16- 3/8	5 1/2
25D	.50	7/16 - 5/8	....	1/4- 3/8	1/4- 7/16	1/4- 7/16	5 1/2
25	.50	1/2 - 19/32	1/4- 5/16	....	5/16	5/16	5 1/2
26A	.62	1/2 - 5/8	1/4	3/8	5/16- 7/16	5/16- 7/16	6
26	.62	1/2 - 11/16	1/4- 3/8	....	5/16	5/16	6
27A	.62	9/16 - 5/8	....	5/16- 3/8	3/8- 7/16	3/8- 7/16	6
27B	.62	9/16 - 11/16	3/8	5/16	3/8	3/8	6 1/2
27	.62	19/32- 11/16	5/16- 3/8	....	....	....	6 1/2
28A	.74	9/16 - 3/4	....	5/16- 7/16	3/8- 1/2	3/8- 1/2	7
28	.74	19/32- 25/32	5/16- 7/16	....	....	....	7
29A	.74	5/8 - 3/4	....	3/8- 7/16	7/16- 1/2	7/16- 1/2	7
28S	.74	5/8 - 25/32	7/16	3/8	7/16	7/16	7
29	.74	11/16- 25/32	3/8- 7/16	....	....	....	7 1/2
30A	.90	5/8 - 13/16	....	3/8- 1/2	7/16- 9/16	7/16	8
30B	.90	5/8 - 7/8	1/2	3/8- 9/16	7/16- 5/8	7/16- 9/16	8
30	.90	11/16- 7/8	3/8- 1/2	9/16	5/8	9/16	8
31A	.90	3/4 - 13/16	....	7/16- 1/2	1/2- 9/16	1/2	9
31B	.90	3/4 - 7/8	1/2	7/16- 9/16	1/2- 5/8	1/2- 9/16	9
31	.90	25/32- 7/8	7/16- 1/2	9/16	5/8	9/16	9
31C	.90	13/16- 7/8	1/2	1/2- 9/16	9/16- 5/8	9/16	9
32	1.10	25/32- 31/32	7/16- 9/16	....	....	....	10
32A	1.10	3/4 -1	....	7/16- 5/8	1/2- 3/4	1/2- 11/16	10
32B	1.10	13/16-1	....	1/2- 5/8	9/16- 3/4	11/16	10
33B	1.10	7/8 - 15/16	1/2	9/16	5/8	9/16- 5/8	10
33	1.10	7/8 - 31/32	1/2- 9/16	9/16	5/8	9/16	10
33A	1.10	7/8 -1	1/2	9/16- 5/8	5/8- 3/4	9/16- 11/16	10
33C	1.10	15/16-1	....	5/8	3/4	5/8- 11/16	10
34	1.36	7/8 -1 1/16	1/2- 5/8	9/16	5/8	9/16- 3/4	11
34B	1.36	7/8 -1 1/8	1/2	9/16- 3/4	5/8- 7/8	9/16	11
34A	1.36	15/16-1 1/16	5/8	....	....	5/8- 3/4	11
35	1.36	31/32-1 1/16	9/16- 5/8	....	....	3/4	11
35A	1.36	1 -1 1/8	....	5/8- 3/4	3/4- 7/8	11/16	11
36	1.92	31/32-1 1/4	9/16- 3/4	....	1	7/8	12 1/2
36A	1.92	1 -1 1/4	3/4	5/8	3/4-1	11/16- 7/8	12 1/2
36B	1.92	1 -1 5/16	....	5/8- 7/8	3/4	11/16	12 1/2
37	1.92	1 1/16 -1 1/4	5/8- 3/4	....	1	3/4- 7/8	12 1/2
37A	1.92	1 1/8 -1 1/4	3/4	3/4	7/8-1	7/8	12 1/2
37B	1.92	1 1/8 -1 5/16	....	3/4- 7/8	7/8	....	12 1/2
37S	1.92	1 1/8 -1 3/8	....	3/4	7/8-1 1/8	....	12 1/2
38	2.80	1 1/16 -1 7/16	5/8- 7/8	....	....	3/4-1	13 1/2
38A	2.80	1 1/8 -1 1/2	....	3/4-1	7/8-1 1/4	....	13 1/2
39A	2.80	1 1/4 -1 3/8	3/4	....	1 -1 1/8	7/8	13 1/2
39	2.80	1 1/4 -1 7/16	3/4- 7/8	....	1	7/8-1	13 1/2
39B	2.80	1 1/4 -1 1/2	3/4	1	1 -1 1/4	7/8	13 1/2
39C	2.80	1 5/16 -1 1/2	....	7/8-1	1 1/4	....	13 1/2
40	3.80	1 1/4 -1 5/8	3/4-1	....	1 -1 3/8	7/8-1 1/8	15 1/2
40A	3.80	1 5/16 -1 11/16	....	7/8-1 1/8	....	....	15 1/2
41	3.80	1 7/16 -1 5/8	7/8-1	....	1 3/8	1 -1 1/8	15 1/2
42	5.30	1 7/16 -1 13/16	7/8-1 1/8	....	....	1 -1 1/4	17
42A	5.30	1 1/2 -1 11/16	....	1 -1 1/8	1 1/4	....	17
42B	5.30	1 1/2 -1 7/8	....	1 -1 1/4	1 1/4	....	17
43	5.30	1 5/8 -1 13/16	1 -1 1/8	....	1 3/8	1 1/8-1 1/4	17
44	7.20	1 5/8 -2	1 -1 1/4	....	1 3/8	1 1/8-1 3/8	19
44A	7.20	1 11/16-1 7/8	....	1 1/8-1 1/4	....	....	19
45	7.20	1 13/16-2	1 1/8-1 1/4	....	....	1 1/4-1 3/8	19
46A	10.50	1 11/16-2 1/4	....	1 1/8-1 1/2	....	....	21
46	10.50	1 13/16-2 3/16	1 1/8-1 3/8	....	....	1 1/4-1 1/2	21
47A	10.50	1 7/8 -2 1/4	....	1 1/4-1 1/2	....	....	21
47	10.50	2 -2 3/16	1 1/4-1 3/8	....	....	1 3/8-1 1/2	21
48	14.00	2 -2 3/8	1 1/4-1 1/2	....	....	1 3/8	23
49	14.00	2 3/16 -2 3/8	1 3/8-1 1/2	....	....	1 1/2	23
50A	18.00	1 7/8 -2 5/8	....	1 1/4-1 3/4	....	....	25
50C	18.00	2 1/16 -2 7/16	....	1 3/8-1 5/8	....	....	25
50	18.00	2 3/16 -2 9/16	1 3/8-1 5/8	....	....	1 1/2	25
50B	18.00	2 1/4 -2 5/8	....	1 1/2-1 3/4	....	....	25
51	19.80	2 3/8 -2 9/16	1 1/2-1 5/8	....	....	....	25
52	22.00	2 3/8 -2 3/4	1 1/2-1 3/4	....	....	....	27
52A	22.00	2 7/16 -2 13/16	....	1 5/8-1 7/8	....	....	27
53	24.00	2 9/16 -2 3/4	1 5/8-1 3/4	....	....	....	27
53A	24.00	2 9/16 -2 15/16	1 5/8-1 7/8	....	....	....	27
54A	28.50	2 1/4 -3	....	1 1/2-2	....	....	31
54	28.50	2 9/16 -3 1/8	1 5/8-2	....	....	....	31
54B	28.50	2 5/8 -3	....	1 3/4-2	....	....	31
55	31.00	2 3/4 -3 1/8	1 3/4-2	....	....	....	31
55A	34.00	2 15/16-3 1/8	1 7/8-2	....	....	....	31
56B	40.00	2 5/8 -3 3/8	....	1 3/4-2 1/4	....	....	34
56	40.00	2 3/4 -3 1/2	1 3/4-2 1/4	....	....	....	34
56A	40.00	2 15/16-3 1/2	1 7/8-2 1/2	....	....	....	34
57B	47.00	3 -3 3/8	....	2 -2 1/4	....	....	37
57	47.00	3 1/8 -3 1/2	2 -2 1/4	....	....	....	37
57A	56.00	3 1/8 -3 7/8	2 -2 1/2	....	....	....	37

Armstrong Drop Forged Single End Engineers' Wrenches

For Nuts and Cap Screws

15° Angle, Single Head

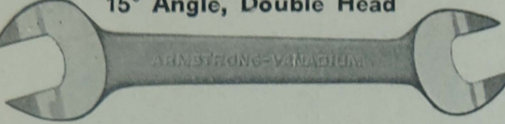
Drop forged from special high carbon steel, hardened all the way through.

Smoothly burnished and finished in black, chip-proof enamel with heads ground bright and the milled opening plainly stamped thereon.

No.	Each	Openings Milled In.	For U.S. Std. Nuts; Bolts In.	For Amer. Std. Nuts (Reg.) & Fin. Bolt In.	For Hex. Head Cap Screws; Diam. In.	For S.A.E. Std. Nuts & Cap Screws; Bolt In.	Extreme Length In.	Wt. Each Lbs.
00	$.28	5/16	1/8	...	1/8	...	3 1/2	1/8
0-A	.30	3/8	...	...	3/16	...	3 1/2	1/12
0	.30	13/32	3/16	...	...	...	3 1/2	1/12
1-A	.36	7/16	...	1/4	1/4	1/4	4 1/2	1/8
1	.36	1/2	1/4	...	5/16	5/16	4 1/2	1/8
2-A	.44	9/16	...	5/16	3/8	3/8	5 1/2	1/4
2	.44	19/32	5/16	...	...	...	5 1/2	1/4
3-A	.52	5/8	...	3/8	7/16	7/16	6 1/2	1/3
3	.52	11/16	3/8	...	...	...	6 1/2	1/3
4-A	.64	3/4	...	7/16	1/2	1/2	7 1/8	1/2
4	.64	25/32	7/16	...	...	...	7 1/8	1/2
5-A	.76	13/16	...	1/2	9/16	...	8 1/4	2/3
5	.76	7/8	1/2	9/16	5/8	9/16	8 1/4	2/3
6-B	.92	15/16	...	...	...	5/8	9	1
6	.92	31/32	9/16	...	...	...	9	1
6-A	.92	1	...	5/8	3/4	11/16	9	1
7	1.14	1 1/16	5/8	...	...	3/4	10 1/2	1 1/4
7-A	1.14	1 1/8	...	3/4	7/8	...	10 1/2	1 1/4
8	1.50	1 1/4	3/4	...	1	7/8	11 3/4	1 3/4
8-A	1.50	1 5/16	...	7/8	...	...	11 3/4	1 3/4
8-B	1.50	1 3/8	...	...	1 1/8	...	11 3/4	1 3/4
9	2.30	1 7/16	7/8	...	...	1	13 1/4	2
9-A	2.30	1 1/2	...	1	1 1/4	...	13 1/4	2
10	3.20	1 5/8	1	...	1 3/8	1 1/8	15	4
10-A	3.20	1 11/16	...	1 1/8	...	...	15	4
11	4.20	1 13/16	1 1/8	...	...	1 1/4	17	5
11-A	4.20	1 7/8	...	1 1/4	...	...	17	5
12	5.70	2	1 1/4	...	...	1 3/8	19	7
12-A	5.70	2 1/16	...	1 3/8	...	...	19	7
13	7.30	2 3/16	1 3/8	...	...	1 1/2	21	9
13-A	7.30	2 1/4	...	1 1/2	...	...	21	9
14	9.20	2 3/8	1 1/2	...	...	...	23	11
14-A	9.20	2 7/16	...	1 5/8	...	...	23	11
15	11.20	2 9/16	1 5/8	...	...	...	25	12 1/2
15-A	11.20	2 5/8	...	1 3/4	...	...	25	12 1/2
16	13.40	2 3/4	1 3/4	...	...	...	27	17
16-B	13.40	2 13/16	...	1 7/8	...	...	27	17
16-A	13.40	2 15/16	1 7/8	...	...	...	27	17
17-A	20.50	3	...	2	...	...	30	20
17	20.50	3 1/8	2	...	...	...	30	20
18-A	29.50	3 3/8	...	2 1/4	...	...	34	30
18	29.50	3 1/2	2 1/4	...	...	...	34	30
19-B	42.00	3 3/4	...	2 1/2	...	...	37	38
19	42.00	3 7/8	2 1/2	...	...	...	37	38
19-C	42.00	4 1/8	...	2 3/4	...	...	37	38
19-A	42.00	4 1/4	2 3/4	...	...	...	37	38
20-B	62.00	4 1/2	...	3	...	...	42	54
20	62.00	4 5/8	3	...	...	...	42	54
20-A	62.00	5	3 1/4	...	...	...	42	54

Armstrong Chrome Vanadium Steel Super Quality Wrenches

Drop Forged Chrome-Vanadium Steel 15° Angle, Double Head



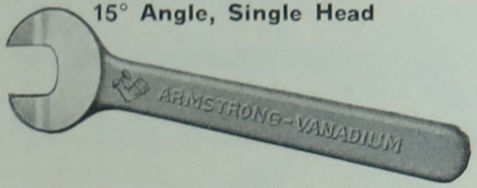
They are drop forged from chrome-vanadium steel, heat treated. Finished in chrome over nickel with heads buffed bright. Guaranteed not to break or spread.

Weight, ounces: No. 1020, 1½; Nos. 1721 to 1723-A, 2; Nos. 1024 to 1025, 3; Nos. 1726 to 1027-C, 4; Nos. 1728 to 1030, 6; Nos. 1731, 1731-A and 1031 to 1033, 12; No. 1731BR, 18; Nos. 1733 to 1034, 1734 and 1035, 16; Nos. 1034BR and 1035BR, 32; Nos. 1735 and 1036 to 1037-A, 27; Nos. 1038 to 1739-B, 44; Nos. 1040 and 1041, 60.

No.	Each	Openings Milled In.	For U.S. Std. Nuts Size Bolts In.	For Amer. Std. Nuts (Reg.) and Fin. Bolts In.	For Hex. Head Cap Screws Diam. Screw In.	For S.A.E. Std. Nuts and Cap Screws Size Bolts In.	Extreme Lgth. In.	Thickness Head In.
1020	$0.75	1/4, 5/16	1/8		1/8		3	5/32
1721	.80	5/16, 3/8	1/8		1/8, 3/16		5 1/2	13/64
1021	.80	5/16, 13/32	1/8, 3/16		1/8		5 1/2	13/64
1722	.80	5/16, 7/16	1/8	1/4	1/8, 1/4	1/4	5 1/2	13/64
1723	.80	3/8, 7/16		1/4	3/16, 1/4	1/4	5 1/2	13/64
1022	.96	5/16, 1/2	1/8, 1/4		1/8, 5/16	5/16	6	7/32
1023	.96	13/32, 1/2	3/16, 1/4		5/16	5/16	6	7/32
1723-A	.96	3/8, 1/2	1/4		3/16, 5/16	5/16	6	7/32
1024	1.16	13/32, 19/32	3/16, 5/16				6 1/2	1/4
1725	1.16	7/16, 1/2	1/4	1/4	1/4, 5/16	1/4, 5/16	6 1/2	1/4
1725-A	1.16	7/16, 9/16		1/4, 5/16	1/4, 3/8	1/4, 3/8	6 1/2	1/4
1025-A	1.16	7/16, 5/8		1/4, 3/8	1/4, 7/16	1/4, 7/16	6 1/2	1/4
1725-B	1.16	1/2, 9/16	1/4	5/16	5/16, 3/8	5/16, 3/8	6 1/2	1/4
1025	1.16	1/2, 19/32	1/4, 5/16		5/16	5/16	6 1/2	1/4
1726	1.40	1/2, 5/8	1/4	3/8	5/16, 7/16	5/16, 7/16	7	9/32
1026	1.40	1/2, 11/16	1/4, 3/8		5/16	5/16	7	9/32
1727	1.40	9/16, 5/8		5/16, 3/8	3/8, 7/16	3/8, 7/16	7	9/32
1027	1.40	19/32, 11/16	5/16, 3/8				7	9/32
1027-C	1.40	9/16, 11/16	3/8	5/16	3/8	3/8	7	9/32
1728	1.74	9/16, 3/4		5/16, 7/16	3/8, 1/2	3/8, 1/2	8	5/16
1028	1.74	19/32, 25/32	5/16, 7/16				8	5/16
1028-S	1.74	5/8, 25/32	7/16	3/8	7/16	7/16	8	5/16
1729	1.74	5/8, 3/4		3/8, 7/16	7/16, 1/2	7/16, 1/2	8	5/16
1029	1.74	11/16, 25/32	3/8, 7/16				8	5/16
1730	1.74	5/8, 13/16		3/8, 1/2	7/16, 9/16	7/16	8	5/16
1030	1.74	11/16, 7/8	3/8, 1/2	9/16	5/8	9/16	8	5/16
1731	2.35	3/4, 13/16		7/16, 1/2	1/2, 9/16	1/2	9 1/2	3/8
1731-A	2.35	3/4, 7/8	1/2	7/16, 9/16	1/2, 5/8	1/2, 9/16	9 1/2	3/8
1731BR	4.65	3/4, 7/8	1/2	7/16, 9/16	1/2, 5/8	1/2, 9/16	15	3/8
1031	2.35	25/32, 7/8	7/16, 1/2	9/16	5/8	9/16	9 1/2	3/8
1731-B	2.35	13/16, 7/8	1/2	1/2, 9/16	9/16, 5/8	9/16	9 1/2	3/8
1732-A	2.35	3/4, 1		7/16, 5/8	1/2, 3/4	1/2	9 1/2	3/8
1032	2.35	25/32, 31/32	7/16, 9/16				9 1/2	3/8
1732	2.35	13/16, 1		1/2, 5/8	9/16, 3/4	11/16	9 1/2	3/8
1033-A	2.35	7/8, 15/16	1/2	9/16	5/8	9/16, 5/8	9 1/2	3/8
1033	2.35	7/8, 31/32	1/2, 9/16	9/16	5/8	9/16	9 1/2	3/8
1733	3.15	7/8, 1	1/2	9/16, 5/8	5/8, 3/4	9/16, 11/16	10 3/4	7/16
1033-C	3.15	15/16, 1		5/8	3/4	5/8, 11/16	10 3/4	7/16
1034	3.15	7/8, 1 1/16	1/2, 5/8	9/16	5/8	9/16, 3/4	10 3/4	7/16
1034BR	6.20	15/16, 1 1/16	5/8			5/8, 3/4	16	1/2
1734	3.15	7/8, 1 1/8	1/2	9/16, 3/4	5/8, 7/8	9/16	10 3/4	7/16
1035	3.15	31/32, 1 1/16	9/16, 5/8			3/4	10 3/4	7/16
1735	4.40	1, 1 1/8		5/8, 3/4	3/4, 7/8	11/16	12 1/4	1/2
1735BR	6.20	1, 1 1/8		5/8, 3/4	3/4, 7/8	11/16	16	1/2
1036	4.40	31/32, 1 1/4	9/16, 3/4		1	7/8	12 1/4	1/2
1736	4.40	1, 1 1/4	3/4	5/8	3/4, 1	11/16, 7/8	12 1/4	1/2
1736-A	4.40	1, 1 5/16		5/8, 7/8	3/4	11/16	12 1/4	1/2
1037	4.40	1 1/16, 1 1/4	5/8, 3/4		1	3/4, 7/8	12 1/4	1/2
1737	4.40	1 1/8, 1 1/4	3/4	3/4	7/8, 1	7/8	12 1/4	1/2
1037-A	4.40	1 1/8, 1 5/16		3/4, 7/8	7/8		12 1/4	1/2
1038	6.85	1 1/16, 1 7/16	5/8, 7/8			3/4, 1	14	9/16
1738	6.85	1 1/8, 1 3/8		3/4	7/8, 1 1/8		14	9/16
1739	6.85	1 1/4, 1 3/8	3/4		1, 1 1/8	7/8	14	9/16
1039	6.85	1 1/4, 1 7/16	3/4, 7/8		1	7/8, 1	14	9/16
1739-A	6.85	1 1/4, 1 1/2	3/4	1	1, 1 1/4	7/8	14	9/16
1739-C	6.85	1 5/16, 1 1/2		7/8, 1	1 1/4		14	9/16
1739-B	6.85	1 3/8, 1 1/2		1	1 1/8, 1 1/4		14	9/16
1040	12.35	1 1/4, 1 5/8	3/4, 1		1, 1 3/8	7/8, 1 1/8	15 1/2	13/16
1041	12.35	1 7/16, 1 5/8	7/8, 1		1 3/8	1, 1 1/8	15 1/2	13/16

Armstrong Engineers' Wrenches

Chrome Vanadium Steel 15° Angle, Single Head

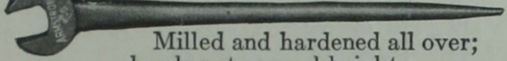


Drop forged from chrome vanadium steel, heat treated. Finished in chrome over nickel, with heads buffed bright. Will not spread or break.

No.	Finished Each	Opening Milled In.	For U. S. Std. Nut Size Bolt, In.	For Amer. Std. Nut (Reg.) & Finished, Bolt, In.	For Hex. Head Cap Screw; Dia. Screw, In.	For S.A.E. Std. Nut and Cap Screw, Size Bolt, In.	Extreme Lgth., In.	Th'k-ness H'd., In.	Wt. Lbs. Each
1000	$ .65	5/16	1/8	...	1/8	...	3 1/2	1/4	1/16
1700	.65	3/8	...	...	3/16	...	3 1/2	1/4	1/12
1000-A	.65	13/32	3/16	...	...	...	3 1/2	1/4	1/12
1701	.80	7/16	...	1/4	1/4	1/4	4 1/2	5/16	1/8
1001	.80	1/2	1/4	...	5/16	5/16	4 1/2	5/16	1/8
1702	1.00	9/16	...	5/16	3/8	3/8	5 1/2	11/32	1/4
1002	1.00	19/32	5/16	...	...	...	5 1/2	11/32	1/4
1703	1.20	5/8	...	3/8	7/16	7/16	6 1/2	3/8	1/3
1003	1.20	11/16	3/8	...	...	...	6 1/2	3/8	1/3
1704	1.45	3/4	...	7/16	1/2	1/2	7 1/8	3/8	1/2
1004	1.45	25/32	7/16	...	...	...	7 1/8	3/8	1/2
1705	1.75	13/16	...	1/2	9/16	...	8 1/4	7/16	2/3
1005	1.75	7/8	1/2	9/16	5/8	9/16	8 1/4	7/16	2/3
1006	2.15	31/32	9/16	...	...	...	9	1/2	1
1706	2.15	1	...	5/8	3/4	11/16	9	1/2	1
1007	2.65	1 1/16	5/8	...	...	3/4	10 1/2	17/32	1 1/4
1707	2.65	1 1/8	...	3/4	7/8	...	10 1/2	17/32	1 1/4
1008	3.50	1 1/4	3/4	...	1	7/8	11 3/4	11/16	1 3/4
1008-A	3.50	1 5/16	...	7/8	...	...	11 3/4	11/16	1 3/4
1708-A	3.50	1 3/8	...	...	1 1/8	...	11 3/4	11/16	1 3/4
1009	5.35	1 7/16	7/8	...	...	1	13 1/4	3/4	2
1709	5.35	1 1/2	...	1	1 1/4	...	13 1/4	3/4	2
1010	7.50	1 5/8	1	...	1 3/8	1 1/8	15	13/16	4
1010-A	7.50	1 11/16	...	1 1/8	...	...	15	13/16	4
1011	9.80	1 13/16	1 1/8	...	...	1 1/4	17	7/8	5
1011-A	9.80	1 7/8	...	1 1/4	...	...	17	7/8	5
1012	13.20	2	1 1/4	...	...	1 3/8	19	15/16	7
1012-A	13.20	2 1/16	...	1 3/8	...	...	19	15/16	7
1013	17.00	2 3/16	1 3/8	...	...	1 1/2	21	1 1/16	9
1013-A	17.00	2 1/4	...	1 1/2	...	...	21	1 1/16	9
1014	21.40	2 3/8	1 1/2	...	...	...	23	1 1/8	11

Armstrong Construction Wrenches

15° Angle

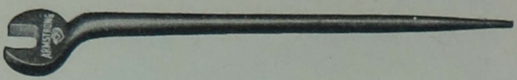


Milled and hardened all over; heads not ground bright.

No.	Hardened Each	Opening In.	For U.S. Std. Nut; Bolt, In.	For Amer. Std. Reg. Bolt, In.	Extreme Nut Length In.	Thickness Head In.
221-A	$.75	7/16	...	1/4	8	3/8
221	.75	1/2	1/4	...	8	3/8
221-B	.75	9/16	...	5/16	8	3/8
222	.75	19/32	5/16	...	8	3/8
223-A	.95	5/8	...	3/8	12	7/16
223	.95	11/16	3/8	...	12	7/16
224-A	.95	3/4	...	7/16	12	7/16
224	.95	25/32	7/16	...	12	7/16
225-A	1.20	13/16	...	1/2	14 1/2	17/32
225	1.20	7/8	1/2	9/16	14 1/2	17/32
226	1.20	31/32	9/16	...	14 1/2	17/32
226-B	1.20	1	...	5/8	14 1/2	17/32
227	1.55	1 1/16	5/8	...	17	5/8
227-A	1.55	1 1/8	...	3/4	17	5/8
228	2.05	1 1/4	3/4	...	19	11/16
228-A	2.05	1 5/16	...	7/8	19	11/16
229	2.70	1 7/16	7/8	...	21	3/4
229-A	2.70	1 1/2	...	1	21	3/4
230	3.60	1 5/8	1	...	23	27/32
230-A	3.60	1 11/16	...	1 1/8	23	27/32
231	5.30	1 13/16	1 1/8	...	21	1
231-A	5.30	1 7/8	...	1 1/4	21	1
232	5.30	2	1 1/4	...	21	1

Armstrong Structural Wrenches

Straight Openings



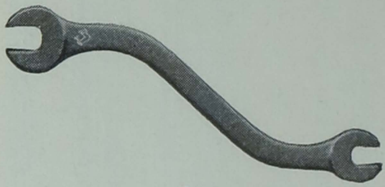
Milled and hardened all over; heads not ground bright.

No.	Hardened, Each	*Opening Milled, Inches	For U. S. Std. Nut; Size Bolt In.	For Amer. Std. Reg. Nut; Size Bolt In.	Extreme Length, Inches	Thickness Head, Inches	Wt. Lbs. Each
901-A	$.80	7/16	...	1/4	9 1/2	3/8	1/3
901	.80	1/2	1/4	...	9 1/2	3/8	1/3
901-B	.80	9/16	...	5/16	9 1/2	3/8	1/3
902	.80	19/32	5/16	...	9 1/2	3/8	1/3
903-A	1.05	5/8	...	3/8	12 1/4	15/32	3/4
903	1.05	11/16	3/8	...	12 1/4	15/32	3/4
904-A	1.05	3/4	...	7/16	12 1/4	15/32	3/4
904	1.05	25/32	7/16	...	12 1/4	15/32	3/4
905-A	1.40	13/16	...	1/2	14 1/2	17/32	1 1/4
905	1.40	7/8	1/2	9/16	14 1/2	17/32	1 1/4
906	1.40	31/32	9/16	...	14 1/2	17/32	1 1/4
906-B	1.40	1	...	5/8	14 1/2	17/32	1 1/4
907	1.85	1 1/16	5/8	...	17	5/8	2
907-A	1.85	1 1/8	...	3/4	17	5/8	2
908	2.35	1 1/4	3/4	...	19	11/16	3 1/4
908-A	2.35	1 5/16	...	7/8	19	11/16	3 1/4
909	3.00	1 7/16	7/8	...	21	3/4	4 1/4
909-A	3.00	1 1/2	...	1	21	3/4	4 1/4
910	4.10	1 5/8	1	...	23	7/8	5 7/8
910-A	4.10	1 11/16	...	1 1/8	23	7/8	5 7/8
911	6.15	1 13/16	1 1/8	...	21	1	7 1/2
911-A	6.15	1 7/8	...	1 1/4	21	1	7 1/2
912	6.15	2	1 1/4	...	21	1	7 1/2

*Nominal opening listed; actual opening includes proper clearance.

Armstrong Drop Forged Car Wrenches

22 1/2° Angle, Double Head



Long leverage. Milled and hardened all over. Heads are not ground. Unhardened wrenches can also be furnished.

No.	Each	*Nominal Openings Milled In.	For U.S. Std. Nuts; Bolts, In.	For Amer. Std. Reg. Nuts; Bolts, In.	Lgth. In.	Wt. Each Lbs.
367-A	$1.50	5/8 & 13/16	....	3/8 & 1/2	12	1 1/2
367	1.50	11/16 & 7/8	3/8 & 1/2	9/16	12	1 1/2
370-A	2.50	13/16 & 1	....	1/2 & 5/8	19	3
370	2.50	7/8 & 1 1/16	1/2 & 5/8	9/16	19	3
370-B	2.50	1 & 1 1/8	....	5/8 & 3/4	19	3
371	3.10	7/8 & 1 1/4	1/2 & 3/4	....	20	3 1/2
372	3.10	7/8 & 1 7/16	1/2 & 7/8	....	20	3 1/2
373	3.10	1 1/16 & 1 1/4	5/8 & 3/4	....	20	3 1/2
373-A	3.10	1 1/8 & 1 5/16	....	3/4 & 7/8	20	3 1/2
374	3.70	1 1/16 & 1 7/16	5/8 & 7/8	....	21	4
375	3.70	1 1/16 & 1 5/8	5/8 & 1	....	21	4
376	3.70	1 1/4 & 1 7/16	3/4 & 7/8	....	21	4
376-A	3.70	1 5/16 & 1 1/2	....	7/8 & 1	21	4
377	4.50	1 1/4 & 1 5/8	3/4 & 1	....	22	5
378	4.50	1 1/4 & 1 13/16	3/4 & 1 1/8	....	22	5
379	4.50	1 7/16 & 1 5/8	7/8 & 1	....	22	5
379-A	4.50	1 1/2 & 1 11/16	....	1 & 1 1/8	22	5
380	5.30	1 7/16 & 1 13/16	7/8 & 1 1/8	....	23	5 3/4
381	5.30	1 7/16 & 2	7/8 & 1 1/4	....	23	5 3/4
382	5.30	1 5/8 & 1 13/16	1 & 1 1/8	....	23	5 3/4
382-A	5.30	1 11/16 & 1 7/8	....	1 1/8 & 1 1/4	23	5 3/4
383	6.30	1 5/8 & 2	1 & 1 1/4	....	24	6 3/4
385	6.30	1 13/16 & 2	1 1/8 & 1 1/4	....	24	6 3/4
385-A	6.30	1 7/8 & 2 1/4	....	1 1/4 & 1 1/2	24	6 3/4
387	9.00	1 13/16 & 2 3/8	1 1/8 & 1 1/2	....	25	9
389	9.00	2 & 2 3/8	1 1/4 & 1 1/2	....	25	9

*Nominal opening listed; actual opening includes proper clearance.

Williams' "Non-Sparking" Safety Wrenches

15-Degree Angle, Single Head

No.	Each	For U. S. Std. Nuts Size In.	Hex. Hd. Cap Screws Size In.	S.A.E. Std. Nuts Size In.	Amer. Std. Nuts, Reglr. & Jam In.	Nom. Openings In.	Extreme Length Approx. In.
G- 5	$9.15	1/2	5/8	9/16	9/16	7/8	8 1/8
G- 7	13.75	5/8	..	3/4	..	1 1/16	10 1/2
G- 8	18.10	3/4	..	7/8	..	1 1/4	12
G- 9	27.70	7/8	..	1	..	1 7/16	13 1/2
G-10	38.55	1	..	1 1/8	..	1 5/8	15
G-11	50.60	1 1/8	..	1 1/4	..	1 13/16	16 1/2
G-12	68.65	1 1/4	..	1 3/8	..	2	18 1/4

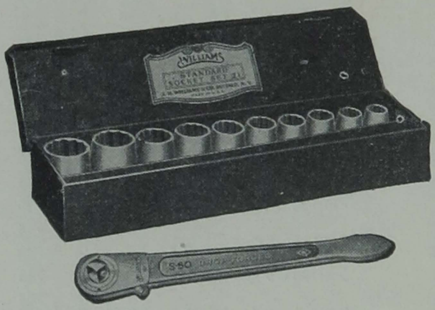
15-Degree Angle, Double Head

No.	Each	For U. S. Std. Nuts Size In.	Hex. Hd. Cap Screws Size In.	S.A.E. Std. Nuts Size In.	Amer. Std. Nuts, Reglr. & Jam In.	Nom. Openings In.	Extreme Length Approx. In.
G-25	$6.25	1/4 & 5/16	5/16	5/16	..	1/2 & 19/32	5 1/2
G-26	7.50	1/4 & 3/8	5/16	5/16	..	1/2 & 11/16	6
G-27	7.50	5/16 & 3/8	..	..	..	19/32 & 11/16	6 1/2
G-28	8.90	5/16 & 7/16	..	..	..	19/32 & 25/32	7
G-29	8.90	3/8 & 7/16	..	..	..	11/16 & 25/32	7 1/2
G-30	10.85	3/8 & 1/2	5/8	9/16	9/16	11/16 & 7/8	8
G-31	10.85	7/16 & 1/2	5/8	9/16	9/16	25/32 & 7/8	8 3/4
G-32	13.25	7/16 & 9/16	..	..	..	25/32 & 31/32	9 1/2
G-33	13.25	1/2 & 9/16	5/8	9/16	9/16	7/8 & 31/32	9 1/2
G-34	16.40	1/2 & 5/8	5/8	9/16 & 3/4	9/16	7/8 & 1 1/16	10 3/4
G-35	16.40	9/16 & 5/8	..	3/4	..	31/32 & 1 1/16	10 3/4
G-36	23.15	9/16 & 3/4	..	7/8	..	31/32 & 1 1/4	12
G-37	23.15	5/8 & 3/4	..	3/4 & 7/8	..	1 1/16 & 1 1/4	12
G-38	33.75	5/8 & 7/8	..	3/4 & 1	..	1 1/16 & 1 7/16	13 1/2
G-39	33.75	3/4 & 7/8	..	7/8 & 1	..	1 1/4 & 1 7/16	13 1/2
G-40	45.75	3/4 & 1	..	7/8 & 1 1/8	..	1 1/4 & 1 5/8	15 1/2
G-41	45.75	7/8 & 1	..	1 & 1 1/8	..	1 7/16 & 1 5/8	15 1/2

No. 21-R Williams' "Supersocket" Wrench Sets

Chrome-Plated over Nickel

Standard Pattern—1/2-Inch Square Drive



Set consists of 10 Standard sockets, 12-point openings, 7/16, 1/2, 9/16, 19/32, 5/8, 11/16, 3/4, 25/32, 7/8 and 1-inch for popular sizes U. S., S.A.E., Amer. Std. nuts and cap screws; 1 ratchet wrench. Furnished in strong steel case, 11 1/2x2 5/8x1 3/4 in. Wt., 4 7/8 lbs.

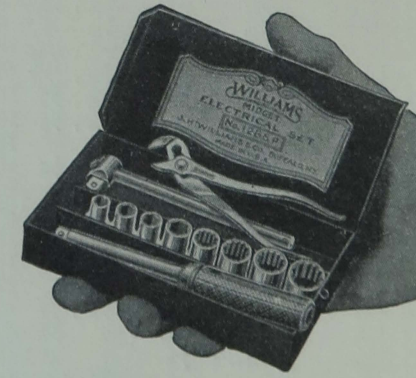
No. 21-R, Complete..........................each **$14.22**

*S-51 Reversible Superratchet may be substituted for S-50 shown above at $2.25 extra.

No. 1268P Williams' "Supersocket" Wrench Sets

Chrome-Plated Over Nickel

9/32-Inch Hex Drive



This set contains 8 Midget Supersockets—4 with hexagon openings 3/16, 7/32, 1/4 and 9/32 inch and 4 with 12-point openings 5/16, 11/32, 3/8 and 7/16 inch; sliding T handle 4 1/2 inches long; extension-driver 5 3/8 inches long, with handy lockable-revolving grip and Midget Superpliers 4 1/2 inches long.

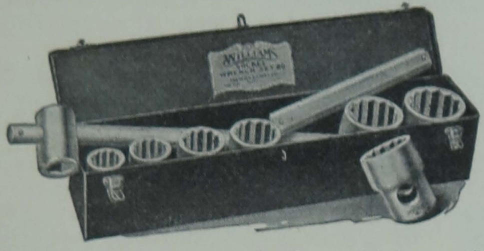
In a strong steel case 5 1/2x2 3/4x1 inches.

No. 1268P..................................per set **$8.88**

No. 80 Williams' "Supersocket" Wrench Sets

Chrome-Plated

Extra Heavy Duty Pattern—1-Inch Hex Drive



Sockets and parts are made from high tensile steel, heat-treated in electric furnaces for maximum strength. Each set is packed in a strong steel case.

Set consists of 7 sockets with 12-point openings, 1¼, 1 7/16, 1⅝, 1 13/16, 2, 2 3/16 and 2⅜ inches; and 3 accessories, Nos. X-20B, X-20C and X-110. Size case, 20¾x4¼x4¼ inches. Weight, 25½ pounds.

No. 80, Complete..........................each **$40.02**

12-Point Sockets

No.	Each	Size Opening Inches	For U.S. Std. Nut Size Bolt Inches	For Hex Head Cap Screw Size Screw Inches	For S.A.E. Std. Nut and Cap Screw Inches	For Amer. Std. Reg. and Jam Nuts, In.
X-1240	**$1.98**	1¼	¾	...	⅞	...
X-1246	**2.22**	1 7/16	⅞	...	1	...
X-1252	**3.00**	1⅝	1	...	1⅛	...
X-1258	**4.20**	1 13/16	1⅛	...	1¼	...
X-1264	**4.80**	2	1¼	...	1⅜	...
X-1270	**6.30**	2 3/16	1⅜	...	1½	...
X-1276	**7.50**	2⅜	1½	...	...	...

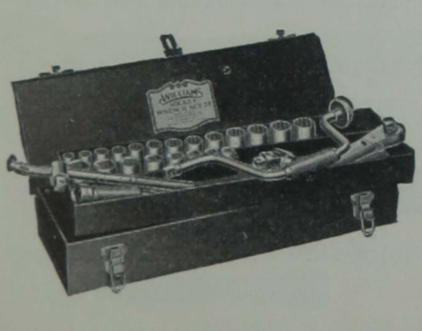
Handles and Parts

No.	Piece	Each
X-20B	Sliding Handle, 20 Inches Long	**$1.20**
X-20C	Adapter for Sliding Handle	**2.52**
X-110	Extension Bar, 9 Inches Long	**2.40**

No. D30 Williams' "Supersocket" Sets

Chrome-Plated Over Nickel

Standard Pattern—½-Inch Square Drive



An efficient, comprehensive assortment for general, all around work.

Set consists of 13 sockets with 12-point openings, 7/16, ½, 9/16, 19/32, ⅝, 11/16, ¾, 25/32, 13/16, ⅞, 15/16, 31/32, and 1 inch, and 8 sockets with square openings, ⅜, 7/16, ½, 9/16, ⅝, 11/16, ¾, and ⅞ inches. Eight accessories Nos. S-10, S-15, S-20C, S-41, S-50, S-110, S-115, and S-140.

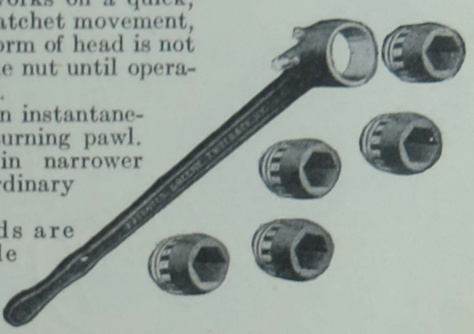
No. S-51 reversible superratchet may be substituted for No. S-50 at an extra charge.

Each set is packed in a steel case, 20x6x3¼ inches.

Weight, 23½ pounds.

No. D30 Set, Complete..........................each **$46.62**

Favorite Reversible Ratchet Wrenches



This wrench works on a quick, straight-ahead ratchet movement, and the socket form of head is not removed from the nut until operation is completed.

Reverse motion instantaneous by simply turning pawl. Can be used in narrower places than an ordinary wrench.

Wrench heads are interchangeable in each handle as shown below. The Nos. 1, 2, 3, 4, 5, 6, 7 and 8 heads fit handle A.

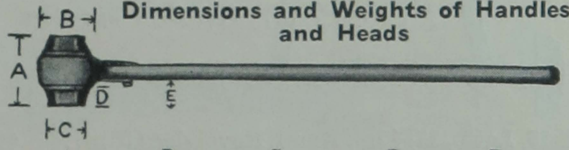
Cadmium-plated finish.

Han-dle	Lgth. of Han-dle	Take Head No.	To Fit U.S.Std. Nuts (Bolt Sizes) in Inches Sq.	To Fit U.S.Std. Nuts (Bolt Sizes) in Inches Hex.	Exact Sizes of Openings Inches Sq.	Exact Sizes of Openings Inches Hex.	PRICE of Head Only	PRICE of Handle Only	Price of Han-dle and One Head	Head Sent if None is Speci-fied
A	15	**1**	¼& ⅜		17/32& 11/16		**$5.00**	**$5.00**	**$10.00**	
A	15	**2**	½& ⅝		15/16&1⅛		**5.00**	**5.00**	**10.00**	
A	15	**3**		¼& ⅜		17/32& 11/16	**5.00**	**5.00**	**10.00**	
A	15	**4**		½& ⅝		29/32&1⅛	**5.00**	**5.00**	**10.00**	
A	15	**5**		⅝& ¾		1⅛ &1 5/16	**5.00**	**5.00**	**10.00**	**5**
B	24	**20**	¾& ⅞		1 5/16 &1½		**6.00**	**7.00**	**13.00**	
B	24	**21**		¾& ⅞		1 5/16 &1½	**6.00**	**7.00**	**13.00**	**21**
B	24	**22**		⅞&1		1½ &1 11/16	**6.00**	**7.00**	**13.00**	
B	24	**23**		1 &1⅛		1 11/16&1⅞	**6.00**	**7.00**	**13.00**	
C	27	**30**	1 &1⅛		1 11/16&1⅞		**8.00**	**9.00**	**17.00**	
C	27	**31**	1 &1¼		1 11/16&2 1/16		**8.00**	**9.00**	**17.00**	
C	27	**32**		1⅛&1¼		1⅞ &2 1/16	**8.00**	**9.00**	**17.00**	**32**
C	27	**33**		1¼&1⅜		2 1/16 &2¼	**8.00**	**9.00**	**17.00**	
C	27	**34**		1¼&1½		2 1/16 &2 7/16	**8.00**	**9.00**	**17.00**	
For Cap Screws										
A	15	**7**		⅝& ¾		⅞ &1 1/16	**5.00**	**5.00**	**10.00**	
A	15	**8**		⅞&1		1 3/16 &1 5/16	**5.00**	**5.00**	**10.00**	
For the New American Standard										
A	15	**6**		½& ⅝		27/32&1 1/32	**5.00**	**5.00**	**10.00**	
B	24	**24**		¾& ⅞		1 5/32 &1 11/32	**6.00**	**7.00**	**13.00**	
B	24	**25**		1 &1⅛		1 17/32&1 23/32	**6.00**	**7.00**	**13.00**	
C	27	**35**		1¼&1½		1 29/32&2 9/32	**8.00**	**9.00**	**17.00**	

Pawl, Spring and Pin Complete

Item	Price
For All Handles ....per set	**$1.50**
Set Screws......each	**.15**
Pawl Only.......each	**$1.20**
Pawl Pins Only..each	**.15**
Pawl Springs Only ....each	**.15**

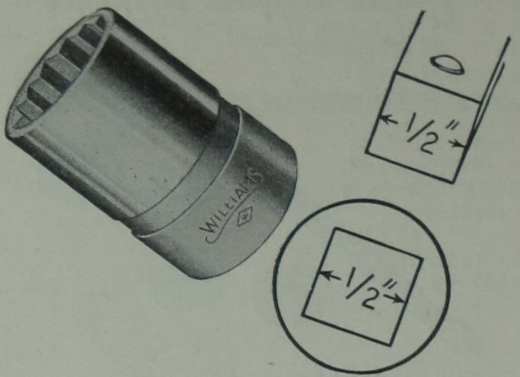
Dimensions and Weights of Handles and Heads



Heads	A Inches	B Inches	C Inches	D Inches	E Inches	Wgt. Lbs.
1	2	2¼	1¾	3/16	½	1
2	3 5/16	2¼	1⅝	¾	1¼	1
3	3¼	2¼	1⅛	¾	1¼	1
4	3 5/16	2¼	1 9/16	¾	1¼	1
5	3 9/16	2¼	1¾	1	1⅜	1¼
6	3¼	2¼	1⅜	¾	1½	1
7	3¾	2¼	1½	13/16	1½	1¼
8	3¾	2¼	1 13/16	1⅛	1 5/16	1¼
20	3 11/16	3	2 13/16	13/16	1⅜	2
21	3¾	3	2	¾	1 7/16	2
22	3¾	3	2 3/16	13/16	1⅜	2
23	4	3	2 13/32	13/16	1½	2
24	3⅝	3	1¾	13/16	1½	2
25	4	3	2⅞	15/16	1½	2¼
30	4 5/16	3⅝	2 17/32	⅞	1⅝	3
31	4 9/16	3⅝	2 25/32	⅞	1⅝	3
32	4½	3⅝	2 11/16	1 1/16	1¾	3
33	4⅝	3⅝	3	13/16	1½	4¼
34	4¾	3⅝	3 7/32	13/16	1½	4½
35	4½	3⅝	3⅛	¾	1⅝	3¾

Handles

Handle	A	B	C
Length Overall.................inches	15	24	27
Weight.........................pounds	2	4½	6¼



Williams' "Supersocket" Wrenches

Chrome-Plated Over Nickel

Standard Pattern—½-Inch Square Drive

Williams' Standard Sockets are furnished with 12-point and square openings. Have thin walls for work in cramped quarters. No useless bulk to prevent operation where space is limited.

Accurately made from high tensile steel—chrome-molybdenum—and heat-treated in electric furnaces for maximum strength.

To use any standard socket (½-inch square female drive) with Bantam Handles (⅜-inch square male drive) use adapter BS-130.

Williams' Reversible "Superratchet" S-51, listed below, is instantly reversible; just snap the shiftlever to "on" or "off." A flip of the thumb does it. Stronger, easier to handle, more efficient. Can be used to advantage with any detachable socket having ½-inch square drive opening.

Fully guaranteed.

Size Opening Inches	**12-Point Straight Wall Sockets** No.	Each	For U.S.Std. Nut Size Bolt Inches	For Hex. Hd. Cap Screw Size Screw Inches	For S.A.E. Std. Nut and Cap Screw Inches	For Amer. Std. Reg. & Jam Nuts Inches	For Amer. Std. Light and Castellated Nuts Inches
5/16	....	....	..	..	..	..	..
3/8	....	....	..	..	..	..	..
7/16	ST-1214	$.72	..	1/4	1/4	1/4	1/4
1/2	ST-1216	.72	1/4	5/16	5/16	..	5/16
9/16	ST-1218	.72	..	3/8	3/8	5/16	3/8
9/16	*SF-1218	1.00	..	..	..	..	..
19/32	ST-1219	.72	5/16	..	..	..	..
5/8	ST-1220	.72	..	7/16	7/16	3/8	7/16
21/32	†ST-1221	.72	..	..	..	..	..
11/16	ST-1222	.84	3/8	..	..	..	..
3/4	ST-1224	.90	..	1/2	1/2	7/16	1/2
25/32	ST-1225	.90	7/16	..	..	..	..
13/16	ST-1226	.90	..	9/16	..	1/2	..
7/8	ST-1228	.90	1/2	5/8	9/16	9/16	9/16
15/16	ST-1230	1.08	..	..	5/8	..	..
31/32	ST-1231	1.08	9/16	..	..	..	..
1	ST-1232	1.08	..	3/4	11/16	5/8	5/8
1 1/16	**S-1234	1.20	5/8	..	3/4	..	..
1 1/8	**S-1236	1.32	..	7/8	..	3/4	..
1 3/16	**S-1238	1.38	..	..	..	..	..
1 1/4	**S-1240	1.44	3/4	..	7/8	..	..

†For Ford A connecting rods. *For Ford V-8 connecting rods. **Taper Nose.

Square Sockets

No.	Each	For Set Screw Inches
S-410	$.72	5/16
S-412	.72	3/8
S-414	.72	7/16
S-416	.72	1/2
S-418	.72	9/16
*S-0418	.90	9/16
S-420	.72	5/8
.....	....	..
S-422	.84	11/16
S-424	.90	3/4
.....	...	..
.....	...	..
S-428	.90	7/8
.....	...	..
.....	....	..
S-432	1.20	1
.....	....	...
.....	....	...

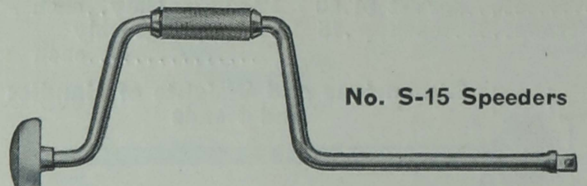
*For all Ford V-8 main bearing bolt heads.

Handles and Parts

No. S-10 Speeders

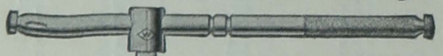
No. S-10, Lgth. 12 In., Knurl. Revolv. Grips.....each $2.70

No. S-15 Speeders



No. S-15, Lgth., 17½ In., Knurl. Revolving Grips..ea. $2.70

No. 20C Offset Sliding T Handles



With 12 pt. socket, rotates hex nut where handle swings only 15 degrees.

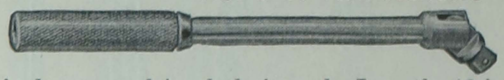
No. 20C, Length 11½ Inches..................each $2.25

No. S-20A Straight Sliding Handles

Similar to No. S-20C, but with straight handle.

No. S-20A, Length, 11 Inches..................each $2.10

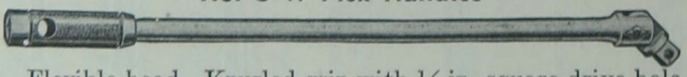
No. S-40 Flex Handles



Flexible head. Knurled grip with ½-inch square drive hole in end. Length, 12 inches.

No. S-40...............................each $3.90

No. S-41 Flex Handles



Flexible head. Knurled grip with ½-in. square drive hole in end for use as extension; ½-in. round hole for bar.

No. S-41, Length, 17 Inches..................each $4.50

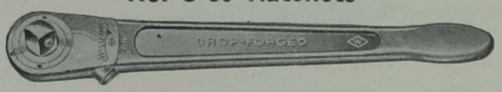
No. S-42 Flex Handles

Similar to No. S-41 except that it is 14 inches long; hole in handle for bar, 7/16 inch.

No. S-42, Handle Only........................each $3.90

Sliding Bar, 7/16-In. Rd. by 9 In. for S-42........each .60

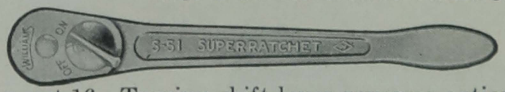
No. S-50 Ratchets



Complete with locked-in reversible plug connector.

No. S-50, Length, 10 Inches.....................each $4.50

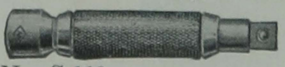
No. S-51 Reversible Ratchets



Has 24 teeth in ratchet gear instead of usual 16. Turning shift-lever reverses action instantly.

No. S-51, Length, 10½ Inches.................each $6.75

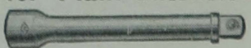
No. S-110 Extension Bars



Length, 5½ inches, with knurled revolving grip.

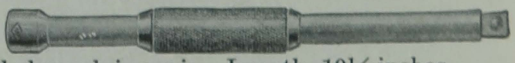
No. S-110...................................each $1.80

No. S-110P Plain Extension Bars



No. S-110P, Length, 5½ Inches...............each $1.20

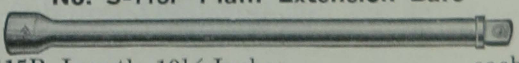
No. S-115 Extension Bars



Knurled revolving grip. Length, 10½ inches.

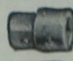
No. S-115.....................................each $2.10

No. S-115P Plain Extension Bars



No. S-115P, Length, 10½ Inches..............each $1.65

No. SH-130 Adapters

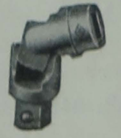


Square female, ½ inch; square male, ¾ inch.

Adapts standard handles (½-inch square male drive) to heavy duty sockets (¾-in. square female drive).

No. SH-130.........................each $1.20

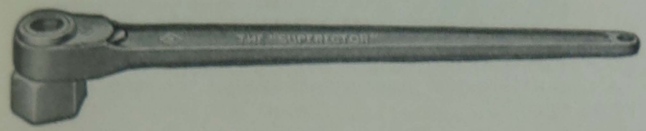
No. S-140 Universal Joints



No. S-140.............................each $2.70

Williams' "Superector" Reversible Ratchet Heavy Duty Wrenches

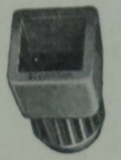
With Quadruple Pawls and Drop-Forged Handle



Hex. Socket

For bridge, structural, and other work requiring fast, dependable tools of rugged strength.

Heat-treated sockets have hole extending through center so that nuts may be turned on any length of bolt.



Square Socket

Wrench provides increased bearing and strength by 2 pawls engaging 2 teeth for both on and off rotation of nuts. All 4 pawls are of hardened tool steel, so designed as to provide pure crushing action on the pawls. Wrench has 20 teeth in all socket gears; consequently, all wrenches will rotate nuts with only an 18° swing of the wrench. Shifter lever, when in neutral, completely disengages all pawls for easy insertion and removal of socket. A flip of the lever reverses the action of the wrench. Socket retaining collar has projection on inner surface which registers easily with corresponding slot in neck of socket. Cover plate, securely seated in wrench head, is fastened by 1 screw.

Wrenches and sockets finished in light metallic gray enamel.

Wrenches

No.	E1–24	E1–36	E2–36	E2–48	E3–48
Wrench Only.....each	$12.60	19.80	25.20	32.40	50.40
Length.........inches	24	36	36	48	53

Sockets

For Nos. E1-24 and E1-36 Wrenches

Nominal Opening, Size Across Flats Inches	No. Hex. Socket	No. Square Socket	Hex. or Square Socket Only Each	For U.S. Std. Nut and Amer. Std. Heavy Nut Size Bolt Hex. or Square Inches	For S.A.E. Std. Nut Size Bolt Hex. Inches	For Amer. Std Regular and Jam Nuts Size Bolt Hex. or Square Inches
1 1/16	E1–617	E1–417	$4.85	5/8	3/4	...
1 1/8	E1–618	E1–418	4.92	...	...	3/4
1 1/4	E1–620	E1–420	5.00	3/4	7/8	...
1 5/16	E1–621	E1–421	5.10	...	...	7/8
1 7/16	E1–623	E1–423	5.20	7/8	1	...
1 1/2	E1–624	E1–424	5.30	...	...	1
1 5/8	E1–626	E1–426	5.40	1	1 1/8	...
1 13/16	E1–629	E1–429	5.65	1 1/8	1 1/4	...
1 7/8	E1–630	E1–430	5.77	...	...	1 1/4
2	E1–632	E1–432	5.90	1 1/4	1 3/8	...
2 3/16	E1–635	E1–435	6.20	1 3/8	1 1/2	...
2 1/4	E1–636	E1–436	6.40	...	...	1 1/2

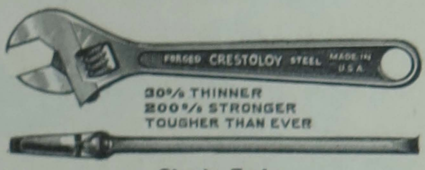
For Nos. E2-36 and E2-43 Wrenches

2	E2–632	E2–432	$9.70	1 1/4	1 3/8	...
2 3/16	E2–635	E2–435	10.00	1 3/8	1 1/2	...
2 3/8	E2–638	E2–438	10.40	1 1/2	...	...
2 9/16	E2–641	E2–441	10.80	1 5/8	...	...
2 3/4	E2–644	E2–444	11.30	1 3/4	...	...
2 15/16	E2–647	E2–447	11.85	1 7/8	...	...
3 1/8	E2–650	E2–450	12.40	2	...	...

For No. E3-48 Wrench

3 1/8	E3–650	E3–450	$20.10	2	...	...
3 1/2	E3–656	E3–456	20.80	2 1/4	...	...
3 7/8	E3–662	E3–462	21.60	2 1/2	...	...
4 1/4	E3–668	E3–468	22.55	2 3/4	...	...
4 5/8	E3–674	E3–474	23.65	3	...	...

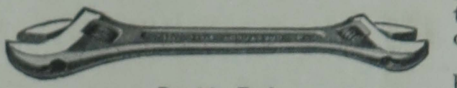
Crestoloy Wrenches



Single End

Made of special alloy steel; chromium plated. Prevents rust. Instantly adjustable to proper size and holds its adjustment until changed. Stands up under hard service. A special method of finishing the handle prevents the tool from becoming slippery when used with hands that are wet or oily.

Packed 1 in a box.



Double End

Single End

No.	Each	Size In.	Capacity In.	Thickness Head Thickest Point, In.	Thickness Head Tip of Jaws, In.	Ship. Wt. Oz.
AC14	$1.00	4	1/2	10/32	4/32	2
AC16	1.00	6	3/4	13/32	7/32	5
AC18	1.25	8	15–16	15/32	8/32	8
AC110	1.50	10	1 1/8	18/32	12/32	13
AC112	2.00	12	1 5/16	24/32	15/32	24
AC115	3.00	15	1 11/16	30/32	19/32	53

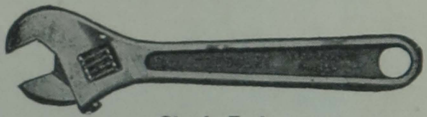
Double End

No.	Each	Size In.	Capacity In.	Thickest Point, In.	Tip of Jaws, In.	Ship. Wt. Oz.
BC146	$1.50	4 6	1/2 3/4	10/32 13/32	4/32 7/32	6 6
BC168	1.75	6 8	3/4 15/16	13/32 15/32	7/32 8/32	9 9

Repair Parts

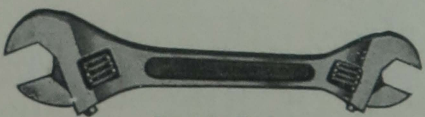
Size Inches	Jaws Each	Knurls Each	Pins Each	Springs Each
4	$.30	$.13	$.05	$.05
6	.30	.13	.05	.05
8	.40	.15	.05	.05
10	.50	.20	.05	.05
12	.75	.26	.10	.05
15	1.10	.30	.10	.05
24	2.00	.40	.15	.05

Crescent Adjustable Wrenches



Single End

For use around automobiles, gas or gasoline engines, motor boats, machine shops, and in fact any place where a wrench is required that will take various sized nuts, the Crescent Wrench will prove indispensable.



Double End

Made of a special analysis carbon tool steel, hardened and toughened by special heat-treating process.

Single End

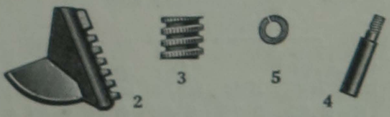
Length......in.	4	6	8	10	12	15	18
Polished....ea.	$.75	$.75	$ .95	$1.20	$1.75	$2.65	$3.80
N. P.........ea.	.90	.90	1.10	1.35	2.25	3.25	4.50
Capacity....in.	1/2	3/4	15/16	1 1/8	1 5/16	1 11/16	2 11/16

Double End

Length......in.	4 & 6	6 & 8	8 & 10	10 & 12
Polished....ea.	$1.30	$1.50	$1.75	$2.35
N. P.........ea.	1.50	1.75	2.10	2.75
Capacity....in.	1/2 & 3/4	3/4 & 15/16	15/16 & 1 1/8	1 1/8 & 1 5/16

Repair Parts

Repair parts for the regular single end wrench are interchangeable with the double.



Lgth. In.	No. 2 Jaw No.	No. 2 Jaw Each	No. 3 Knurl No.	No. 3 Knurl Each	No. 4 Pin No.	No. 4 Pin Each	No. 5 Spring No.	No. 5 Spring Each
4	A14J	$.25	A14K	$.10	A14P	$.05	A14S	$.05
6	A16J	.25	A16K	.10	A16P	.05	A16S	.05
8	A18J	.30	A18K	.12	A18P	.05	A18S	.05
9	O19J	.40	O19K	.15	O19P	.05	A19S	.05
10	A110J	.40	A110K	.15	A110P	.05	A110S	.05
11	O111J	.60	O111K	.25	O111P	.10	O111S	.05
12	A112J	.60	A112K	.25	A112P	.10	A112S	.05
15	A115J	.85	A115K	.35	A115P	.10	A115S	.05
18	A118J	1.15	A118K	.55	A118P	.10	A118S	.05

Westcott Adjustable S Nut Wrenches

THE KEYSTONE MFG.CO.
WESTCOTT

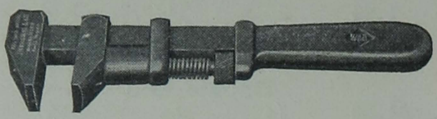
A convenient wrench for general use. Can be used in many places inaccessible to the monkey wrench.

No.	76	78	80	82	84
Per Dozen	$8.00	10.00	12.00	18.00	24.00
Size, in.	6	8	10	12	14
Opens, in.	¾	1	1⅜	1⅝	2
Wt. per Box, lbs.	2⅞	5½	9¾	16½	25½

Extra Parts

Size Wrench, inches	6	8	10	12	14
Jaw, each	$.20	$.30	$.40	$.50	$.60
Thumb Screw, each	.10	.15	.20	.25	.30
Pin, each	.05	.05	.05	.05	.05

Williams' W & B Railroad Special Wrenches



A heavy duty wrench. Head and bar drop-forged in one piece from selected steel. Extra heavy jaws are thoroughly case hardened. Has indestructible iron handle and easy-acting solid steel screw. Wrapped in anti-rust paper.

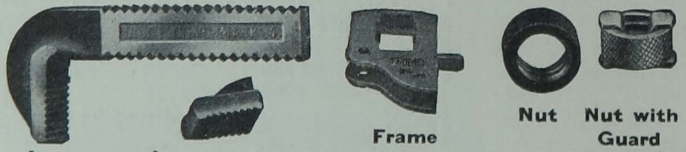
Size In.	Per Doz.	Cap. Jaw In.	Size In.	Per Doz.	Cap. Jaw In.
6	$15.00	1¹⁄₁₆	15	$38.00	2¹³⁄₁₆
8	18.00	1½	18	48.00	3⅛
10	22.00	2	21	58.00	4⅛
12	28.00	2⅜	..	......	...

"Trimo-Alloy" Pipe Wrenches

Made entirely of heat-treated chrome-molybdenum, manganese and nickel steel alloys.

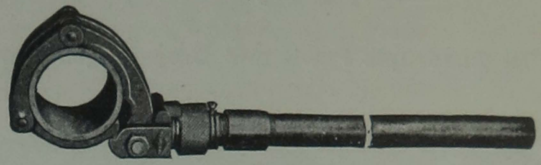
Length Open, In.	Takes Pipe, In.	With Steel Handle Each	With Wood Handle Each	Length Open, In.	Takes Pipe, In.	With Steel Handle Each	With Wood Handle Each
6	⅛ to ½	$1.90	$2.00	18	¼ to 2	$5.50	.....
8	⅛ to ¾	2.20	2.30	24	¼ to 2½	8.50	.....
10	⅛ to 1	2.85	3.15	36	½ to 3½	15.00	.....
12	⅛ to 1¼	3.35	3.60	48	1 to 5	25.00	.....
14	¼ to 1½	3.85	4.25	..	....	.....	.....

Extra Parts



For Wrench In.	Movable Jaw	Nuts	Insert Jaws and Pins	Frames and Pins	Springs and Pins	Extra Frame Pins	Extra Jaw Pins	Steel Handles	Wood Handles with Ferrule	Nut Guards per Pr.
	Each									
6	$.65	$.15	$.50	$.45	$.03	$.03	$.03	$1.00	$.23	$.15
8	.70	.15	.55	.55	.03	.03	.03	1.15	.25	.15
10	1.10	.20	.65	.70	.03	.04	.04	1.60	.30	.20
12	1.25	.25	.75	.75	.03	.04	.04	1.80	.35	.30
14	1.50	.30	.85	.80	.03	.04	.04	2.20	.36	.30
18	2.15	.35	.95	.95	.04	.04	.04	3.25	...	.35
24	3.50	.55	1.10	1.75	.04	.04	.04	5.15	...	.45
36	5.70	1.10	1.50	2.75	.04	.05	.05	10.50	...	.55
48	9.00	2.00	2.00	3.50	.04	.05	.05	17.00	...	.65

Walworth Parmelee Pipe Wrenches

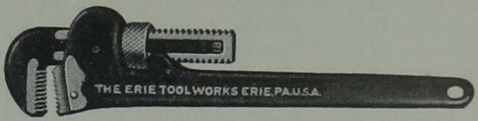


No. 4

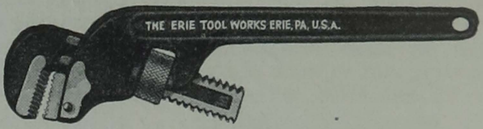
Grips with equal pressure all around the pipe, which prevents crushing.

No.	Lgth. In.	Takes Pipe In.	Complete Each	Without Girths Each	Extra Girths Size In.	Extra Girths Each
1	10	⅜ to 1	$8.50	$2.75	⅜–½–¾–1	$1.75
2	20	1 to 2	15.00	6.00	1–1¼ 1½–2	2.50 3.00
3	20	2 to 3	17.00	7.00	2–2½–3	4.00
4	37	3 and 4	52.00	21.00	3 and 4	17.00

Erie Pipemaster Wrenches



Straight Handle



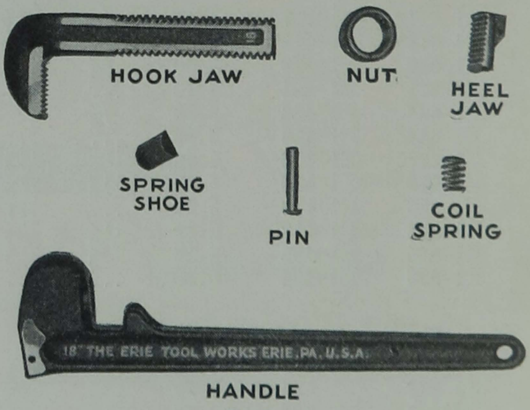
Offset Handle

Outstanding in superior strength, extra capacity and simplified construction. Handle and housing are of one piece, electrically heat treated to a remarkably high tensile strength and guaranteed not to break.

Hook and heel jaws are of vanadium steel; both replaceable. A coil spring furnishes a perfect double action for the jaw, which insures instant gripping and release. This type of spring guarantees the maximum in life and efficiency. Parts, except the improved spring and shoe, are interchangeable with similar wrenches.

The offset, with the same price as the straight handle wrench, is furnished in 8, 10, 14 and 18-inch sizes only.

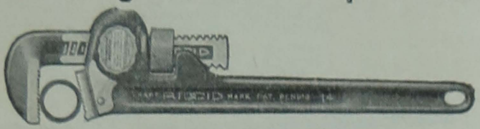
Attractively polished, with baked enamel handle. 6 to 24-inch sizes, inclusive, packed 6 to a fibreboard box. Any assortment required will be neatly boxed to sell as a set.



Parts

Size In.	Wrench Each	Hook Jaw Each	Heel Jaw Each	Pin Each	Nut Each	Coil Spring Each	Shoe for Spring Each	Handle Ass'm'd Each	Pipe Capacity In.	Weight Lbs. per Dozen
6	$1.90	$.65	$.35	$.03	$.15	$.03	$.07	$1.50	¾	5
8	2.20	.70	.40	.03	.15	.03	.07	1.65	1	10
10	2.85	1.10	.50	.04	.20	.03	.07	2.25	1½	20½
14	3.85	1.50	.60	.04	.30	.03	.12	2.85	2	39
18	5.50	2.15	.70	.04	.35	.04	.16	4.00	2½	60
24	8.50	3.50	.80	.04	.55	.04	.16	6.00	3	96½
36	15.00	5.70	1.10	.05	1.10	.04	.16	11.75	4½	200
48	25.00	9.00	2.00	.05	2.00	.04	.21	19.50	6	337

Ridgid Straight Pattern Pipe Wrenches



Jaws are of chrome molybdenum steel.

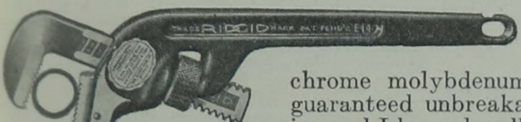
Housing and I-beam handle are of double strength alloy metal. Housing unconditionally guaranteed against warping.

Adjusting nut turns easily in open housing. This feature allows a full finger and thumb grip on nut, making possible a much easier and quicker adjustment. Packed 6 in a box.

Size In.	Each	Cap. In.	Wt., Lbs. per Box	Size In.	Each	Cap. In.	Wt., Lbs. per Box
6	$1.90	¾	2½	24	$8.50	3	50
8	2.20	1	5	36	15.00	4½	*16½
10	2.85	1½	10	48	25.00	6	*28
14	3.85	2	20	60	40.00	8	*45
18	5.50	2½	30	..	.....	...	.....

*Weight each.

Ridgid End Pattern Pipe Wrenches



Jaws made of chrome molybdenum. Housing guaranteed unbreakable. Housing and I-beam handle are of special alloy metal and meet U.S. Government and Navy strength specifications. One-hand adjustment. Three working parts. For coil work and tight places.

Packed 6 in a box.

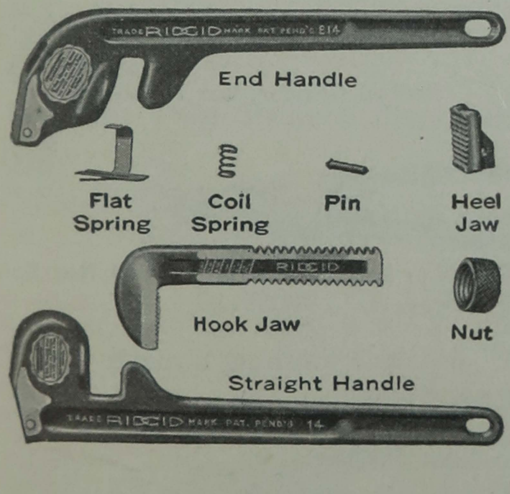
Size..............in.	E6	E8	E10	E14	E18	E24	E36
Each...............	$1.90	2.20	2.85	3.85	5.50	8.50	15.00
Cap..............in.	¾	1	1½	2	2½	3	4½
Wt. per Box.....lbs.	2½	5	10¾	20	31	50½	*16½

*Weight, each.

Rubber Grips

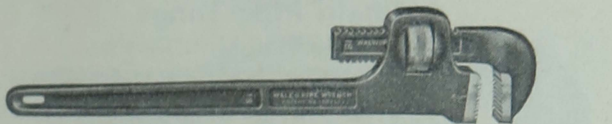
For Wrench Size.......................inches	10	14
1 Dozen in Box...................per dozen..	$3.60	4.80

Replacement Parts for Ridgid Pipe Wrenches



Size In.	Handle Straight	Handle End	Hook Jaw	Heel Jaw	Pin	Coil Spring	Flat Spring	Knurled Nuts	Handle Assembled Straight	Handle Assembled End
	Each									
6	$1.00	$1.00	$.65	$.35	.03	...	$.20	$.15	$1.50	$1.50
8	1.15	1.15	.70	.40	.03	...	.20	.15	1.65	1.65
10	1.60	1.60	1.10	.50	.04	.03	.20	.20	2.25	2.25
14	2.20	2.20	1.50	.60	.04	.03	.30	.30	2.85	2.85
18	3.25	3.25	2.15	.70	.04	.04	.40	.35	4.00	4.00
24	5.15	5.15	3.50	.80	.04	.04	.50	.55	6.00	6.00
36	10.50	10.50	5.70	1.10	.05	.04	.60	1.10	11.75	11.75
48	17.00	.....	9.00	2.00	.05	.04	.80	2.00	19.50	.....
60	20.00	.....	15.00	4.00	.05	.04	1.20	3.00	25.00	.....

No. 4111 Walco Pipe Wrenches



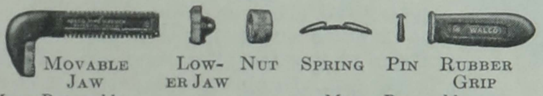
A heavy duty wrench forged of a high grade tool steel. The drop forging of the handle and the jaw housing in one piece is a feature furnishing both simplicity and strength. Heat treatment of all parts by precision methods gives extra strength and toughness.

The renewable lower jaw has cross tongues on its under side which fit into a cross slotted seat on the handle. This new construction eliminates all backward shear on its pin, locks it securely in place against loosening, and yet permits easy renewal. Black rust proof Parkerized finish with cadmium plated nut.

Made to Federal Specifications GGG-W-651 for Type II, Heavy Duty Adjustable Pipe Wrenches.

Lgth. Open In.	Takes Pipe In.	Each	Lgth. Open In.	Takes Pipe In.	Each	Lgth. Open In.	Takes Pipe In.	Each
6	⅛ to ½	$1.90	14	¼ to1½	$3.85	36	¼ to 4	$15.00
8	⅛ to ¾	2.20	18	¼ to 2	5.50	48	1 to 6	25.00
10	⅛ to 1	2.85	24	¼ to 2½	8.50	..	....	.....

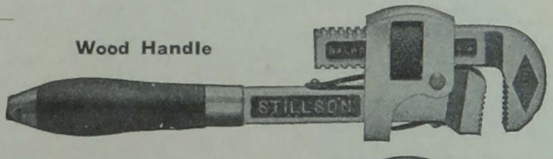
Extra Parts

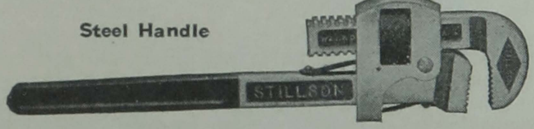


Size In.	Movable Jaw Each	Renewable Lower Jaw & Pin Each	Nut Each	Spring Each	Size In.	Movable Jaw Each	Renewable Lower Jaw and Pin Each	Nut Each	Spring Each
6	$.65	...	$.15	$.25	18	$2.15	$.95	$.35	$.50
8	.70	...	.15	.30	24	3.50	1.10	.55	.60
10	1.10	$.65	.20	.35	36	5.70	1.50	1.10	.70
14	1.50	.85	.30	.40	48	9.00	2.00	2.00	.80

Pins only for lower jaw, 10 to 24-inch, 4 cents each; 36 and 48-inch, 5 cents each. Rubber grips for 10-inch, 30 cents; 14-inch, 40 cents.

Walworth Genuine Stillson Wrenches





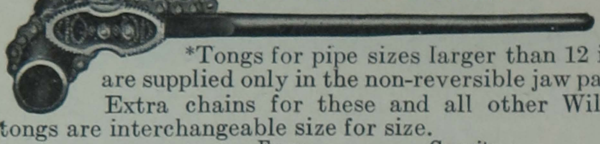
Sizes 6 to 48-inch, with steel handle; 6 to 14-inch, inclusive, also with wood handle; 10 and 14-inch sizes are furnished with steel handle unless otherwise specified.

Length Open Inches	Takes Pipe Inches	Price, Each: Wrench Complete Steel Handle	Wrench Complete Wood Handle	Extra Parts Bar with Springs	Extra Parts Jaws
6	⅛ to ½	$1.90	$2.00	$1.00	$.65
8	⅛ to ¾	2.20	2.30	1.15	.70
10	⅛ to 1	2.85	3.15	1.60	1.10
14	¼ to 1½	3.85	4.25	2.20	1.50
18	¼ to 2	5.50	....	3.25	2.15
24	¼ to 2½	8.50	....	5.15	3.50
36	¼ to 3½	15.00	....	10.50	5.70
48	1 to 5	25.00	....	17.00	9.00

For Wrench in.	Extra Parts—Price, Each: Frame and Pin	Frame Pin Only	Adjusting Nuts	Wood Handle & Ferrule	End Nuts	Front Springs Each	Back Springs Pair	Spring Pins or Rivets
6	$.45	$.03	$.15	$.23	$.15	$.10	....	$.01
8	.55	.03	.15	.25	.15	.10	....	.01
10	.70	.04	.20	.30	.20	.10	$.20	.02
14	.80	.04	.30	.36	.20	.10	.20	.02
18	.95	.04	.35	...	...	.10	.20	.02
24	1.75	.04	.55	...	...	.11	.22	.02
36	2.75	.05	1.10	...	...	.13	...	.02
48	3.50	.05	2.00	...	...	.13	...	.02

Williams' Improved Vulcan Drop-Forged Chain Pipe Tongs

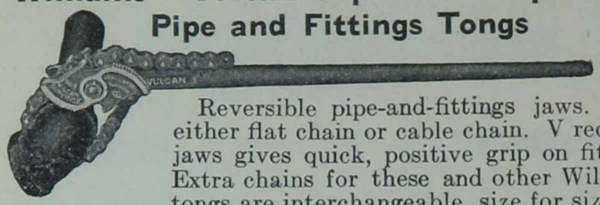
With Flat Link Chain



*Tongs for pipe sizes larger than 12 inches are supplied only in the non-reversible jaw pattern. Extra chains for these and all other Williams' tongs are interchangeable size for size.

No.	Complete Each	Extra: Chains Each	Extra: Jaws per Pair	Extra: Nuts & Studs per Set	Capacity Pipe Inches	Lgth. In.	Wt. Lbs.
30	$5.00	$1.50	$2.00	$.40	⅛ to ¾	13¾	2
31	7.00	2.00	3.50	.50	⅛ to 1½	20	5¾
32	10.00	3.00	5.50	.70	¼ to 2½	27	10
33	14.00	5.00	8.00	.90	¾ to 4	37	17
33½	18.00	7.00	9.50	1.10	1 to 6	44½	24
34	22.00	9.00	11.00	1.40	1½ to 8	50½	31
35	36.00	15.00	15.00	1.80	2 to 12	64½	52
*15½	60.00	30.00	24.00	....	4 to 16	85	98
*16	80.00	40.00	32.00	....	4 to 18	87	137

Williams' "Vulcan Superior" Drop-Forged Pipe and Fittings Tongs

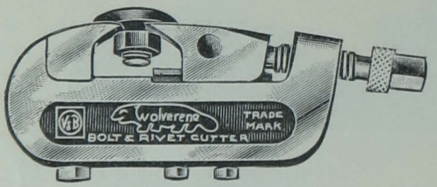


Reversible pipe-and-fittings jaws. Take either flat chain or cable chain. V recess in jaws gives quick, positive grip on fittings. Extra chains for these and other Williams' tongs are interchangeable, size for size.

No.	Complete	Extra Chain	Extra Jaws *per Pr.	Extra Bolt and Nut	Capacity Fittings In.	Extreme Lgth. In.	Wt. Lbs.
0	$5.00	$1.50	$2.00	$.28	⅛–¾	13¾	2
1	7.00	2.00	3.50	.36	⅛–1½	20	5½
2	10.00	3.00	5.50	.46	¼–2½	27	10
3	14.00	5.00	8.00	.60	¾–4	37	17
3½	18.00	7.00	9.50	.70	1 –6	44½	26
4	22.00	9.00	11.00	.90	1½–8	50½	34
5	36.00	15.00	15.00	1.30	2 –12	64½	54

*If only a single jaw is wanted, specify right or left.

Wolverene Bolt, Rivet and Nut Cutters

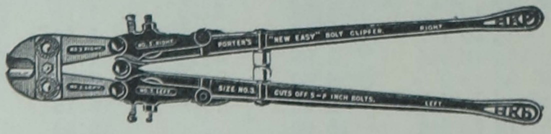


With 10000 lbs. cutting pressure it cuts bolts and nuts rapidly. Any ½-inch standard wrench will operate this cutter. A ratchet handle as used in all socket wrench sets may also be used. Extension bars, universal joints and other socket wrench attachments may be used in conjunction with a ratchet handle if required. All parts replaceable; main body forged; cutting jaws, special electric furnace alloy steel, heat treated and tempered; chrome vanadium alloy pressure screw with ½-inch square head.

Length, 6½ inches. Capacity, cuts ⅝-inch bolts; splits ⅞-inch diameter nuts. Width of cutting jaws, ¾ inch. Weight each, 2 pounds.

Each $6.50

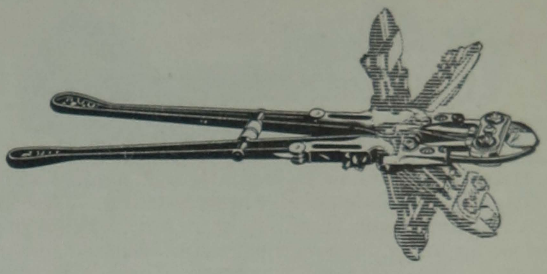
Porter New Easy Bolt Clippers


PORTER'S "NEW EASY" BOLT CLIPPER
RIGHT
SIZE NO. 1
LEFT

Has japanned malleable iron handles, rubber buffers, and tempered tool steel jaws. The jaws can be dressed when necessary with a mill file. Furnished with clipper cut or center cut jaws.

No.	0-NE	1-NE	2-NE	3-NE
Bolt Clipper .... each	$4.00	$5.00	$7.00	$9.00
Extra Jaws .... per pair	2.00	2.45	3.50	4.45
Approximate Length .... in.	18	24	30	36
For Annealed Bolts in Thread .. in.	5/16	⅜	½	⅝
For Soft Rods .... in.	¼	5/16	⅜	½
For Spring Wire with Special Temper Jaws Only .... in.	.203	.238	.284	.340
Approximate Weight .... lbs.	3¼	5¼	8½	12½

Porter Swivel Head Cutters



The swivel head principle permits the head of the tool to swing into any position from in line with the handles to full right angle position on either side, so that the tool actually does bend to the job. Full cutting efficiency is maintained in any position.

Clipper Cut or Center Cut

No. Swivel Head	0	1	2
Complete .... each	$6.25	$7.50	$9.75
Cutterheads .... each	2.50	3.25	4.00
Jaws .... pair	2.00	2.45	3.50
Approximate Weight .... pounds	4	6¼	9¾
Length .... inches	19	25	31
Capacities:			
Annealed Bolts in the Thread ... inches	5/16	⅜	½
Soft Rod .... inches	¼	5/16	⅜

Soft Chain or Hard Chain or Side Nut Splitter

No. Swivel Head	0	1	2
Complete .... each	$6.75	$8.00	$10.50
Cutterheads .... each	3.00	3.75	4.75
Jaws .... pair	2.50	2.95	4.25
Approximate Weight .... pounds	4	6¼	9¾
Length .... inches	19	25	31
Capacities:			
Soft Chain .... inches	¼	5/16	⅜
Hard Chain .... inches	¼	5/16	11/32
Nuts of Bolts of Diameter ..... inches	5/16	⅜	½

*Electric Wire Cutter, Insulated

No. Swivel Head	0	1	2
Complete .... each	$8.75	$10.25	$13.25
Cutterheads .... each	2.50	3.25	4.00
Jaws .... pair	2.00	2.45	3.50
Approximate Weight .... pounds	4¼	6¾	10½
Length .... inches	19⅞	25⅝	31½

*Special Clipper, Not Insulated

No. Swivel Head	0	1	2
Complete .... each	....	$7.50	$9.75
Cutterheads .... each	....	3.25	4.00
Jaws .... pair	....	2.45	3.50
Approximate Weight .... pounds	....	6¼	9¾
Length .... inches	....	25	31

End Cutter or Angular Cutter or End Nut Splitter

No. Swivel Head	1
Complete .... each	$8.50
Cutterheads .... each	4.25
Jaws .... pair	3.45
Approximate Weight .... pounds	6½
Length .... inches	25
Capacities:	
Annealed Bolts in the Thread .... inches	⅜
Soft Rods .... inches	5/16
Nuts of Bolts of Diameter .... inches	⅜

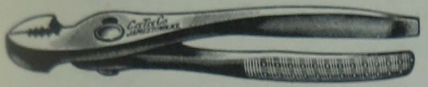
Swivel Conversion Kit

Contains right and left swivel assembly with positioning spring and instructions for converting standard Porter Clipper into swivel head clipper.

No.	0	1	2
Kit Complete .... each	$2.25	2.50	2.75

*When used on bolts and rods, electric wire cutters and special clippers have the same capacity as regular clippers of the same size. The jaws of the No. 1 size open to ¾ inch and of the No. 2 size to 1⅛ inches. This opening, wider than that of regular bolt clippers, is to take in the covering of insulated wires.

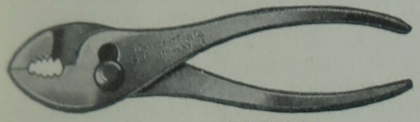
CeeTeeCo Combination Pliers



This is a high grade tool with nickel-plated finish.

No.	H25	H26	H28	H210
Each	$.30	.30	.45	.65
Size, inches	5	6	8	10
Capacity, inches	¾	1	1¼	1½
Weight, Each, ounces	3½	8	10	16

Crescent MoToR KiT Combination Pliers

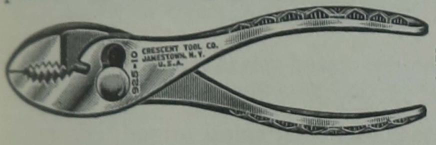


Slip joint style with knurled handles. Milled teeth in jaws. Case-hardened bolt and nut. 1 in a box.

	Nickel Finish				Black Finish			
No.	G25	G26	G28	G210	G35	G36	G38	G310
Each	$.50	.50	.60	.85	.30	.30	.45	.65
Length, in.	5	6	8	10	5	6	8	10

No. 925 Crescent Combination Pliers

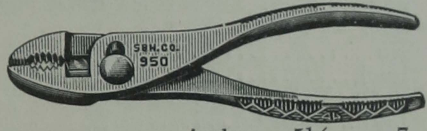
Slip joint. Made of special steel, hardened and oil-tempered. Chromium-plated finish.



One in a box.

Size In.	Each	Cap. In.	Wt. Oz.
6	$1.00	1	9
8	1.25	1¼	12
10	1.50	1½	18

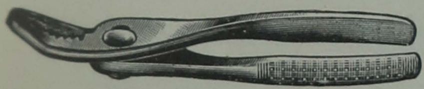
No. 950 S & H Combination Side Cutting Pliers



Made of forged tool steel. Slip joint and pipe grip in jaw. No pinch. Knurled handles. Nickel-plated. Packed 1 in a box.

Size, inches	5½	7
No. 950, each	$1.25	1.60

Crescent Thin Bent Nose Pliers

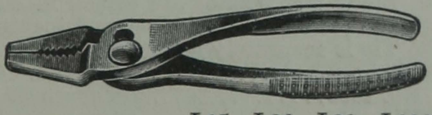


Thin bent nose, for use on check nuts and similar work. Slip joint.

Size, inches	6
Capacity, "	1

No. J26, Nickel-Plated .... each $.60

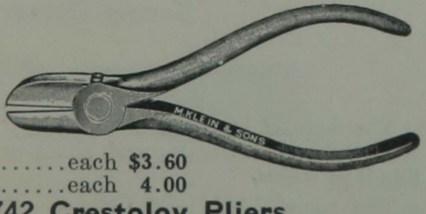
Crescent Thin Straight Nose Pliers



Slip joint. Convenient for narrow places. Checkerdot handles. Nickel-plated.

No.	L25	L26	L28	L210
Length, inches	5	6	8	10
Price, each	$.50	.50	.75	1.00

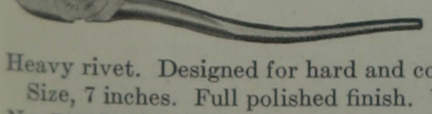
No. 202 Klein's Oblique Cutting Pliers



Cuts close, the narrow head permitting its use in confined places. Knives are perfectly fitted. Lap joint type.

No.	each
No. 202-5	$3.60
No. 202-6	4.00

No. 742 Crestoloy Pliers

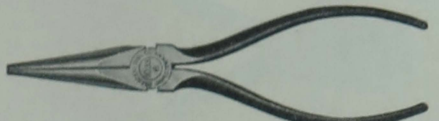


A diagonal cutting plier of forged steel. Smooth joint action. Good leverage, keen edges. Heavy rivet. Designed for hard and continual usage.

Size, 7 inches. Full polished finish. Weight, 9 ounces.

No. 742, Packed 1 in a box .... each $1.60

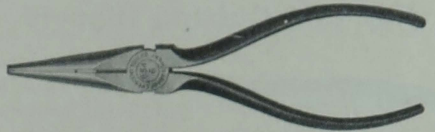
No. 1033 Crestoloy Extra Long Nose Chain Pliers



Individually tested. Polished head; gun metal handles. Packed one in a box.

Size, in.	6	7
Each	$1.15	1.25

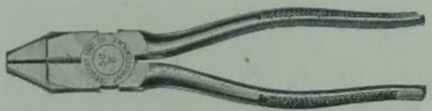
No. 654 Crestoloy Long Nose Side Cutting Pliers



Of forged steel. Keen edges. Polished head, gun metal handles. Packed 1 in a box.

6-Inch, Lgth. Overall, 6⅝ in., Wt. 5 oz .... each $1.50
7-Inch, Lgth. Overall. 7 7/16 in.; Wt. 6 oz .... each 1.65

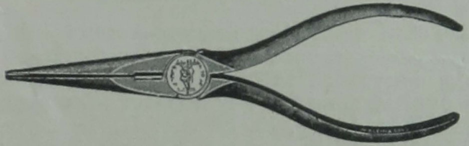
No. 50 Crescent Side Cutting Pliers



Forged from special tool steel with spring-tempered handles. Has keen edged cutters. Packed one in box.

Size, inches	4	5	6	7	8
No. 50, each	$.90	1.00	1.10	1.25	1.50

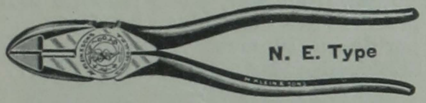
No. 203 Klein's Long Nose Side Cutting Pliers



Designed for work in restricted spaces. Equipped with cutting knives.

Price, No. 203-5, Length 5 Inches .... each $3.80
" " 203-6 " 6 " .... " 4.20

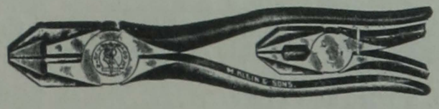
No. 201 Klein's Side Cutting Pliers



Nose and all edges rounded and shoulder of head removed.

No.	201-6NE	201-7NE	201-8NE	201-9NE
Each	$4.50	$5.30	$5.80	$7.10
Wt. Lbs. per Doz.	5	7½	12	12½

No. 201 Klein's Side Cutting Pliers

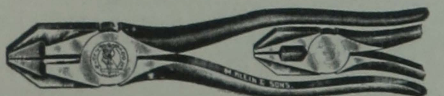


Diamond Special for use on bare and insulated wire.

Cat. No.	201-5	201-6	201-7	201-8	201-9
Size, inches	5	6	7	8	9
Price, each	$4.20	4.50	5.30	5.80	7.10

No. 212 Klein's Side Cutting Pliers

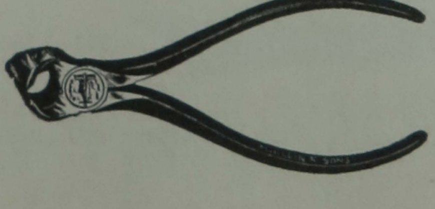
With Sleeve Joint Twisters



Diamond Special for use on bare and insulated wire, with sleeve joint twister.

No.	212-6	212-7	212-8
Each	$5.30	6.00	7.10
Size, inches	6	7	8

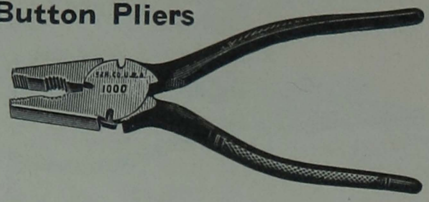
No. 232 Klein's End Cutting Pliers



Stout jaws and broad cutting knives.

No.	Each
232-5½	$6.00
232-7	6.70

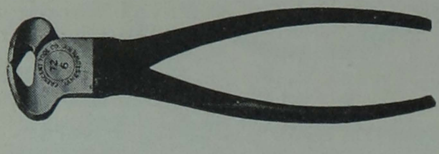
No. 1000 Crescent Combination 2-Cutter Button Pliers



Forged steel. Gun metal handles.

In. Size	No. in Box	Each
5	1	$.70
6	1	.80
8	1	1.00
10	1	1.25

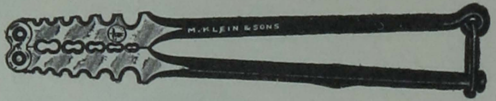
No. 72 Crestoloy End Cutting Nippers



Forged crestoloy steel. Smooth gun metal handles.

Size In.	No. in Box	Each
6	1	$1.10
7	1	1.25

No. 132-15 Klein's Combination Wire and Sleeve Clamps



The unusual range of wire and sleeve sizes covered by this clamp makes it practically a universal tool for telegraph, telephone and power line work. Has 5 round holes for twisting bare wire and an oval opening for guy wire or messenger strand. Copper wire Nos. 4, 6, 8, 10, 12, A.W.G. Iron wire Nos. 6, 8, 10, 12, 14, B. W. G. Strand opening .437x.624.

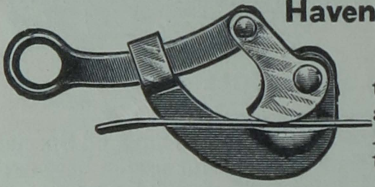
Reverse side has 5 chambers for twisting double tube sleeves. Copper sleeves Nos. 6, 8, 10, 12, 14, 17, A.W.G. Iron sleeves Nos. 8, 10, 12, 14, 16, 19, B. W. G.

Hammer forged from high grade crucible tool steel. Oil tempered, polished head and black handles.

Weight, per dozen, 16 pounds.

Price No. **132-15**, Size 11¼ inches............each **$9.50**

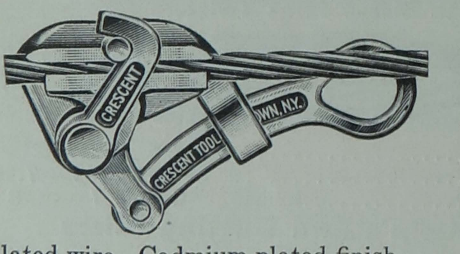
Haven's Steel Grips



Almost automatic in action. Handle and eccentric allow instantaneous hold. A shake of the rope on the tackle disengages the grip.

No. **1604-10**, for No. 4 Wire and Finer...........each **$4.00**
No. **1604-20**, for ½-Inch Wire and Finer.........each **6.00**

Crescent Wire Grips

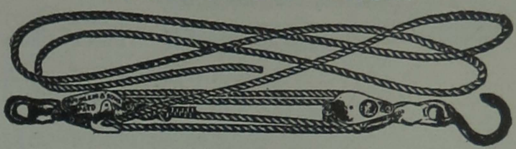


All parts are of forged steel, heat treated. Grip is tight, yet won't injure wire. Easily released by a flip of the rope; will not jam. Hook prevents dropping from wire. For bare or insulated wire. Cadmium plated finish.

Packed one in a box.

No.	**383**	**385**
Each	**$6.75**	**11.20**
Maximum Opening, in.	½	13/16
Minimum Opening, in.	3/16	⅜
Safe Load, lbs.	5000	10000
Weight, Packed, lbs.	2	4¾

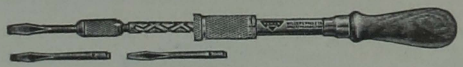
No. 1802-30 Klein's Self-locking Troublemens' Blocks



Especially for use with Klein's Wire Grips. No. 1802-30 is furnished with 25 feet ⅜-inch Manila rope, 2½ pounds. Consists of light steel shell blocks galvanized, fitted with snubbing hook to lock load in any position. To lock load, pull luff rope under hook. To release, simply pull rope. Blocks are arranged with spring guard snap hooks. When pulling up wire to make a splice, it may be used with two grips attached to snaps or with hook to anchor to an insulator-pin or other convenient anchorage.

Cat. No.	Description	Wt. Lbs.	Price per Set
1802-30	Galv., with 25 Ft. ⅜-inch Rope......	2½	$7.20

Millers Falls Spiral Ratchet Screwdrivers



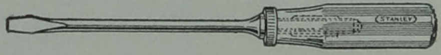
A perfected, chromium-plated spiral ratchet screwdriver. Right and left hand ratchet movements. Has a device for making it rigid.

Has accurately machined steel spiral or rod, chromium-plated manganese bronze spiral nuts, hardened tool steel ratchet pawls, stained hardwood handle, and blades of special analysis steel. Exposed metal parts polished and chromium-plated. Three screwdriver blades furnished. One in a box.

No.	**67A**	**61A**	**62A**
Each	**$2.40**	**3.20**	**4.30**
Lgth., Extended with Bit, in.	12⅝	20½	26¼
Lgth., Closed, in.	9⅜	14¼	17¼
Wt. without Blades, lbs.	8	16	24
Wt., 3 Blades Included, lbs.	1½	2¼	3

No. 1006 Stanley Stanloid Screw Drivers

With Heavy Round Blade



The handle is made of Stanloid, a tough non-metallic substance. It is unbreakable, shockproof, and will not soak up oil or water. Designed and fluted for a secure comfortable grip.

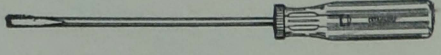
Blade and bolster are forged in one piece. Handle and blade are permanently fastened together.

Tip is accurately machine cross ground.

Blade, inches	**4**	**6**	***8**	***12**
No. **1006**, per dozen	**$9.20**	**12.20**	**15.25**	**18.30**
Diameter, inches	¼	5/16	⅜	7/16
Over All, inches	7¾	10¼	13	17

*With nut shaped bolster.

No. 1008 Stanley Electricians' Stanloid Screw Drivers



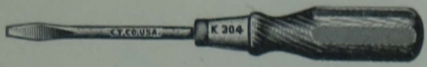
The handle is made of Stanloid, a tough non-metallic substance. It is break-proof, shock-proof, and will not soak up oil or water.

The round blade and bolster are forged in one piece. Handle and blade are permanently fastened together. Tip is accurately machine cross ground.

Caution: Handle will burn rapidly if held in contact with an open flame.

Length of Blade, inches	**3**	**6**	**10**
No. **1008**, per dozen	**$7.30**	**9.20**	**10.40**
Diameter Blade, inches	3/16	3/16	3/16
Length Over All, inches	6⅞	9½	13⅜

Crescent Screwdrivers

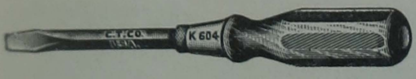


General purpose type for home or shop. Ferrule turned, not pressed. Hard maple handle, natural finish; cannot turn or work loose. Polished blade and ferrule.

Packed 6 in a box; each one paper wrapped.

		Dimensions, Inches				Wt. Per Doz.	
No.	Each	Length Blade	Length Over All	Width Point	Size Rd. Rod	Lbs.	Oz.
K302	$.30	2	6	5/32	1/4	1	11
K303	.30	3	7	3/16	1/4	1	14
K304	.35	4	8 3/4	1/4	1/4	2	10
K305	.40	5	9 3/4	5/16	5/16	3	9
K306	.45	6	12	5/16	5/16	4	12
K308	.60	8	14	3/8	3/8	6	12
K310	.70	10	16	3/8	3/8	7	9
K312	.80	12	18	3/8	3/8	8	6

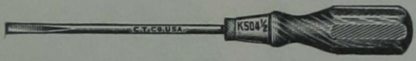
Crescent Square Rod Screwdrivers


C.T.CO.
U.S.A.
K 604

For heavy work. Blades hardened full length; square rod enables wrench to be used. Rod extends clear through handle. Ferrules turned from solid bar of steel and forced onto blade under heavy pressure. Hard maple handle, natural finish. Polished blade and ferrule. Packed 6 in a box.

No.	Each	Length Blade Inches	Length Over All Inches	Width Point Inches	Size Sq. Rod Inches	Weight Pounds per Doz.
K602	$.40	2	6	1/4	1/4	2 3/16
K603	.45	3	7	1/4	1/4	2 7/16
K604	.50	4	8 3/4	1/4	1/4	3 7/16
K605	.55	5	9 3/4	5/16	5/16	4 3/4
K606	.60	6	12	5/16	5/16	5 1/2
K608	.80	8	14	3/8	3/8	9
K610	1.00	10	16	3/8	3/8	10 1/8
K612	1.10	12	18	3/8	3/8	11

Crescent Cabinet Screwdrivers

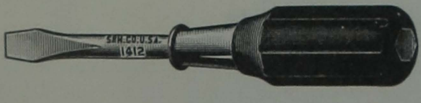


For fine work. No flare at point. Ferrule turned from solid bar and forced onto bit under heavy pressure. Handles of straight grained, hard maple, natural finish; will not work loose. Polished blade and ferrule.

Packed 6 in a box, each one paper wrapped.

		Dimensions, Inches				Wt. Per Doz.	
No.	Each	Length Blade	Length Over All	Width Point	Size Rd. Rod	Lbs.	Oz.
K502 1/2	$.30	2 1/2	6 1/2	3/16	3/16	1	6
K503 1/2	.35	3 1/2	7 1/2	3/16	3/16	1	9
K504 1/2	.35	4 1/2	8 1/2	3/16	3/16	1	13
K505 1/2	.40	5 1/2	9 1/2	3/16	3/16	1	14
K506 1/2	.45	6 1/2	10 1/2	3/16	3/16	2	..
K508 1/2	.50	8 1/2	12 1/2	3/16	3/16	2	5
K510 1/2	.55	10 1/2	14 1/2	3/16	3/16	2	8
K512 1/2	.60	12 1/2	16 1/2	3/16	3/16	2	11

No. 1412 S. & H. Extra Heavy Screwdrivers



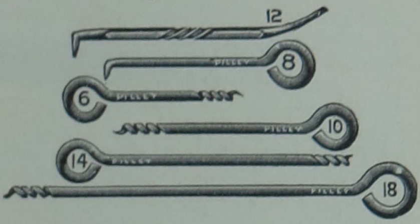
Short, stocky tool with round forged alloy tool steel blade extending through handle.

Black wood handle, polished blade and ferrule.

Packed 6 in a box.

Size	in.	1 3/4	2 1/2	3 1/2	4 1/2
Each		.....	.....	.....	.....
Length over All	in.	6 3/4	7 1/2	8 1/2	9 1/2
Size Rod	in.	3/8	7/16	7/16	1/2
Weight per Dozen	lbs.	2 5/8	5 3/8	6 1/2	8 1/2

Pilley's Packing Tools



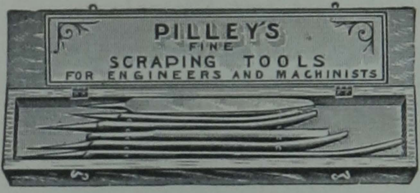
Will go into any valve, rod, pump or engine stuffing box. Of special tool steel and guaranteed not to break while in use removing packing from stuffing boxes of engines and valve rods. Nickel-plated, preventing rusting.

Made of 3/16, 1/4 and 5/16-inch steel and in 6, 8, 10, 12, 14, and 18-inch lengths. Each set packed in separate box.

Shipping weight: Set No. 1, about 12 ounces each. Set No. 2, about 21 ounces each.

Price, No. **1,** Set of Four Packing Tools, 6, 10, 12, 14-inch.....................................per set **$2.25**
Price, No. **2,** Set of Six Packing Tools; 6, 8, 10, 12, 14, 16-inch.........................per set **3.25**

Pilley's Scraping Tools



For scraping valves, journals, bearings, etc. Of durable tool steel, forged, tempered and polished so each is true in shape and has an edge keen for work.

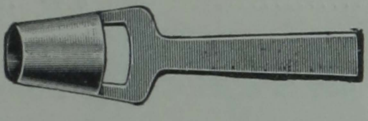
Set contains one 14, one 12, one 10 and one 8-inch half round scraper, one 6-inch three cornered scraper and one 12-inch double end scraper. All mounted in a substantial case. Made in flat ground and hollow ground.

Shipping weight about 5 pounds per set.

Price No. **1**, Set of Six Flat Ground Scraping Tools ....per set **$4.75**
Price, No. **2**, Set of Six Special Hollow Ground Scraping Tools..........................per set **6.00**

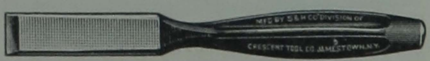
Special sizes and shapes made to order.

Arch Punches



Size Inches	Price per Dozen	Size Inches	Price per Dozen	Size Inches	Price per Dozen
3/8	**$17.75**	1	**$26.10**	1 3/4	**$72.00**
7/16	**17.75**	1 1/16	**29.90**	1 7/8	**78.50**
1/2	**18.70**	1 1/8	**33.60**	2	**87.50**
9/16	**19.60**	1 3/16	**37.40**	2 1/8	**96.50**
5/8	**20.55**	1 1/4	**41.15**	2 1/4	**107.70**
11/16	**21.45**	1 5/16	**44.95**	2 3/8	**121.10**
3/4	**22.40**	1 3/8	**48.70**	2 1/2	**136.90**
13/16	**23.30**	1 7/16	**54.30**	2 3/4	**168.30**
7/8	**24.25**	1 1/2	**59.85**	3	**201.90**
15/16	**25.15**	1 5/8	**66.20**	...	......

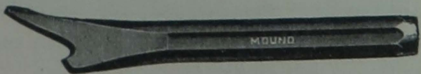
No. 175 Crescent Wood Chisels


MFD BY S&H CO DIVISION OF
CRESCENT TOOL CO JAMESTOWN N.Y.

Polished blade, lacquered handle; packed 3 in a box.

No. 175	each	**$.70**	**.80**	**.90**
Width Blade	inches	3/4	1	1 1/4
Length Overall	inches	9	9	9
Weight	ounces	12	13	14

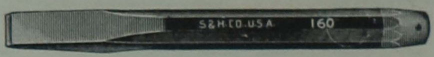
No. 605 Mound Special Beading Tools



Made of high-grade crucible tool steel. Octagon shaped.

Price, No. **605**, Size 5/8 Inch	each	**$1.40**
" " **605** " 3/4 "	"	**1.60**
" " **605** " 7/8 "	"	**1.80**

No. 160 S & H Cold Chisels

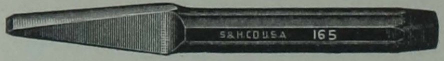

S&H.CO.U.S.A. 160

Forged tool steel. Hardened, tempered and tested.
Blue black finish. Polished blade with red head.

Sizes up to ⅝-inch packed 1 dozen in a box; larger sizes, 6 in a box.

Cutting Edge	inches	¼	5/16	⅜	½
Length	inches	4¾	5	5½	6
Weight per Dozen	pounds	¾	1¼	2	3¾
Price	each	$.25	.30	.30	.35
Cutting Edge	inches	⅝	¾	⅞	1
Length	inches	6½	7½	7½	8
Weight per Dozen	pounds	7	11	18	20
Price	each	$.50	.50	.60	.75

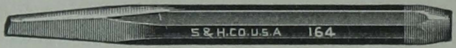
No. 165 S & H Cape Chisels


S&H.CO.U.S.A. 165

Up to ⅝-inch, 1 dozen in a box; larger sizes, 6 in a box.

Cutting Edge	inches	¼	5/16	⅜	½	⅝	¾
Diam. Steel	inches	⅜	½	⅝	¾	⅞	⅞
Length	inches	5½	6	6½	7½	8	8½
Price	each	$.40	.50	.55	.75	.90	1.00

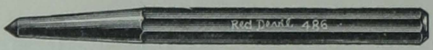
No. 164 S & H Diamond Point Chisels


S&H.CO.U.S.A. 164

Up to ⅝-inch, 1 dozen in a box; larger sizes, 6 in a box.

Cutting Edge	inches	¼	5/16	⅜	½
Diameter Steel	inches	⅜	½	⅝	¾
Length	inches	5½	6	6½	7½
Price	each	$.40	.50	.55	.75

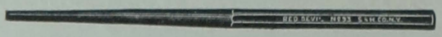
No. 486 S & H Centre Punches


Red Devil 486

Forged steel. Packed 1 dozen in a box.

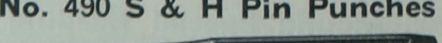
Stock	inches	¼	5/16	⅜	½
Length	inches	3½	4	5	6
Weight per Dozen	pounds	¾	1	2¾	3¾
Each		$.20	.20	.30	.40

No. 95 S & H Repair and Lining Up Punches



Point	inches	6/32	8/32	12/32
Stock	inches	½	⅝	¾
Length	inches	9	10	12
Weight per Dozen	pounds	5	8	15
Each		$.45	.60	.75

No. 490 S & H Pin Punches

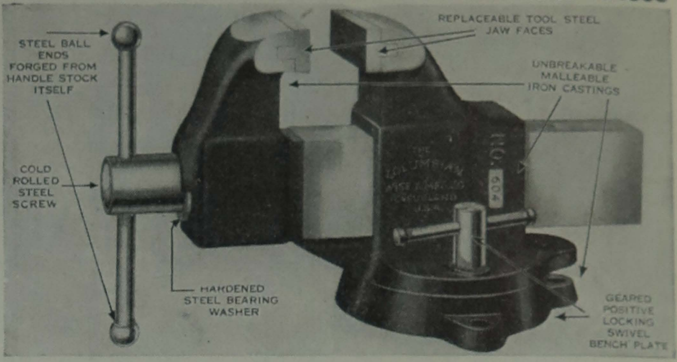

S&H.CO.U.S.A. 490

Forged tool steel. Blue enamel finish with red head and polished point. Stock, ½ in. Length, 9 in.

Packed one dozen in a box.

Point	inches	⅛	5/32	3/16	¼	5/16	⅜
Wt., per Dozen	lbs.	4	4	4 5/16	4 7/16	4 9/16	4⅞
No. 490	each	$.40	.40	.40	.40	.40	.40

Columbian Malleable Iron Machinists' Vises

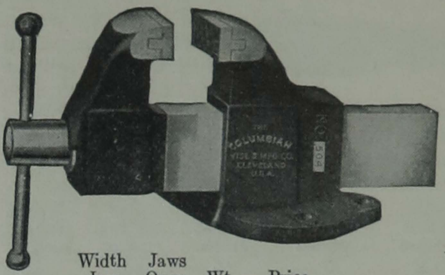

STEEL BALL ENDS FORGED FROM HANDLE STOCK ITSELF
REPLACEABLE TOOL STEEL JAW FACES
UNBREAKABLE MALLEABLE IRON CASTINGS
COLD ROLLED STEEL SCREW
HARDENED STEEL BEARING WASHER
GEARED POSITIVE LOCKING SWIVEL BENCH PLATE
COLUMBIAN
604

Columbian Malleable Iron Machinists' Vises have many distinctive features, are unbreakable, and fool-proof.

They are made in every type and size.

Columbian Malleable Iron Machinists' Vises

Stationary Base


COLUMBIAN VISE & MFG. CO. CLEVELAND U.S.A.
504

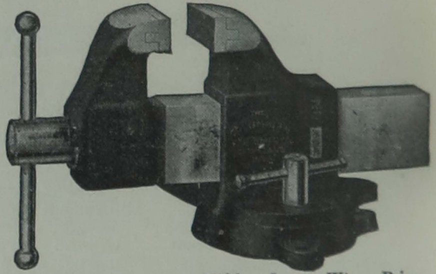
Replaceable tool steel jaw faces, pinned on, cover the entire gripping surface of the jaws, accurately machined and heat treated.

No.	Width Jaw In.	Jaws Open In.	Wt. Lbs.	Price Each	No.	Width Jaw In.	Jaws Open In.	Wt. Lbs.	Price Each
502½	2½	3½	13	$9.00	505	5	8	58	$20.00
503	3	4½	20	10.00	505½	5½	9	74	30.00
503½	3½	5	27	11.25	506	6	10	90	39.00
504	4	6	34	12.75	507	7	12	118	55.00
504½	4½	7	44	15.50	508	8	13	150	75.00

Columbian Malleable Iron Machinists' Vises

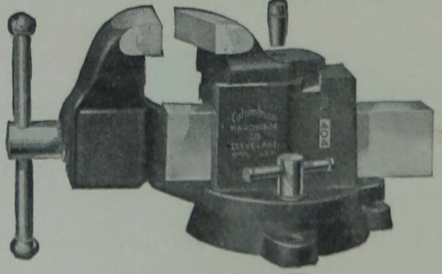
Swivel Base

Swivel base allows vise to be clamped in any desired position. Sizes larger than 5 inches fitted with 2 swivel clamping nuts.



No.	Width Jaw, In.	Jaws Open, In.	Wt. Lbs.	Price Each	No.	Width Jaw, In.	Jaws Open, In.	Wt. Lbs.	Price Each
602½	2½	3½	15	$12.00	605	5	8	70	$30.00
603	3	4½	25	13.00	605½	5½	9	84	38.00
603½	3½	5	32	15.00	606	6	10	100	52.00
604	4	6	39	17.00	607	7	12	135	70.00
604½	4½	7	55	20.00	608	8	13	160	98.00

Columbian Malleable Iron Machinists' Vises


Columbian HARDWARE CO. CLEVELAND
404

Adjustable Jaw Swivel Base

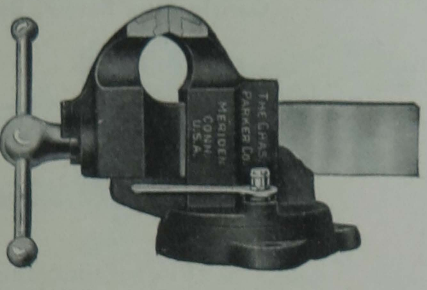
This tool is adapted for a wide range of work.

All sizes larger than 5 inches fitted with 2 swivel clamping nuts.

No.	Each	Width Jaw, In.	Jaws Open, In.	Wt. Lbs.	No.	Each	Width Jaw, In.	Jaws Open, In.	Wt. Lbs.
403	$17.50	3	4	26	405½	$44.00	5½	9	88
403½	20.00	3½	4¾	35	406	60.00	6	9½	116
404	24.00	4	5¼	44	407	75.00	7	11	152
404½	28.00	4½	6	55	408	105.00	8	12	207
405	35.00	5	7½	68	...	......	...	...	...

Parker's Eclipse Machinists' Vises

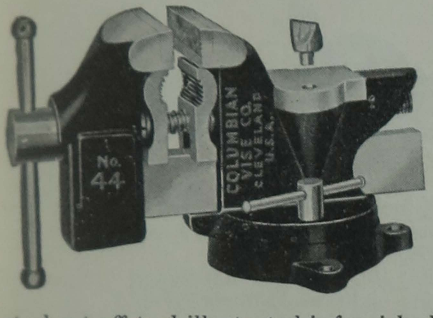
Stationary Jaw Swivel Base



Parkco metal castings. Swivel base gives 360° gripping power. Renewable, milled and fitted tool steel faces. Extra size, strong cut-screw and nut. Saddle and saddle screw.

No.	Each	Width Jaws, In.	Jaws Open, In.	Wt. Lbs.	No.	Each	Width Jaws, In.	Jaws Open, In.	Wt. Lbs.
201	$12.00	2½	3½	17	206	$30.00	5	8	104
202	13.00	3	4½	26	206½	38.00	5½	9	130
203	15.00	3½	5½	42	207	52.00	6	10½	157
204	17.00	4	6½	59	208	98.00	8	13¾	298
205	20.00	4½	7	76	.....	.....	...	....	...

Columbian Garage Vises

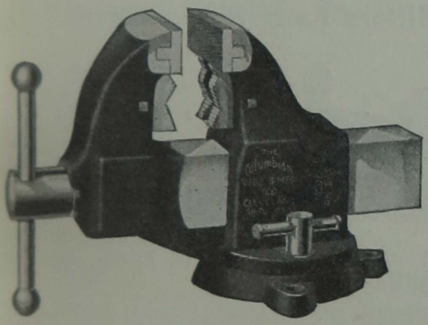


Swivel Base

Holds up to 1½-inch pipe. Has replaceable hardened steel jaw faces, anvil back, removable pipe jaws, permanently locked screw collar, cold rolled steel screw and handle and wrought steel sliding beam. The steel cut-off tool illustrated is furnished with each vise.

No.	43	43½	44
Vises.....each	$3.00	4.50	7.50
Size Jaw.....inches	3	3½	4
Approximate Weight.....pounds	14	17	28

Columbian Malleable Iron Combination Pipe Vises

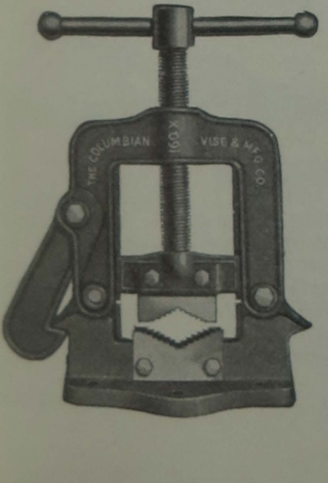


Swivel Base

The 3 tool steel pipe jaws are interchangeable and each made with 2 working ends. Jaws are properly heat treated.

No.	Width of Jaw Inches	Holds Pipe Inches	Jaws Open Inches	Weight Pounds	Price Each	Price Jaws per Set (3)
203½	3½	⅛ to 2½	4	35	$17.50	$2.70
204½	4½	⅛ to 3½	5	58	24.00	3.60
205	5	⅛ to 4½	6	90	35.00	6.00
206	6	⅛ to 6	10	152	49.00	9.00

Columbian Malleable Iron Hinged Pipe Vises

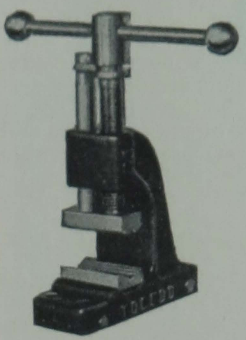


The tool steel jaws with accurately milled teeth are heat treated for hardness and tempered in oil to give toughness. Cold rolled steel is used for the screwhead and handle. Ball ends of handle are forged on. Flat base is made with 3 bolt holes.

No.	Holds Pipe Inches	Approx. Wt. Lbs.	Price Each
16 X	⅛ to 1½	5¾	$3.60
160X	⅛ to 2	8½	4.25
161X	⅛ to 2½	11	5.00
162X	⅛ to 3½	17½	7.50
163X	⅛ to 4½	26½	11.00
164X	½ to 6	40	23.50

Toledo Open-Side Pipe Vises

Excellent for brass or copper pipe and for fitting make-up work. No need of unlatching and tipping back a yoke for long lengths of pipe. Operator simply slips pipe into open side and tightens down jaws.



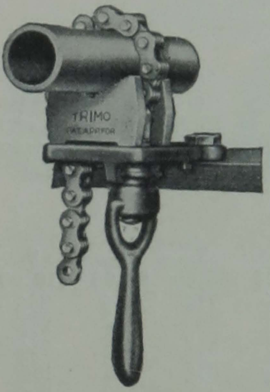
Full overlapping upper and lower jaws. Jaw construction permits working close to face of vise; jaws are easily replaced. Malleable iron frame; long, oversize handles.

Packed in individual cartons.

No.	Each	Lgth. Jaws In.	Cap. In.	Ship Wt. Lbs.
00	$2.85	2¼	⅛–1½ Incl.	6¾
0	3.60	2½	⅛–2½ Incl.	12
3	8.40	3¼	⅛–4½ Incl.	27½

Bench Clamp for No. 00 Vise. Ship. Wt. 4 Lbs.........each $1.20

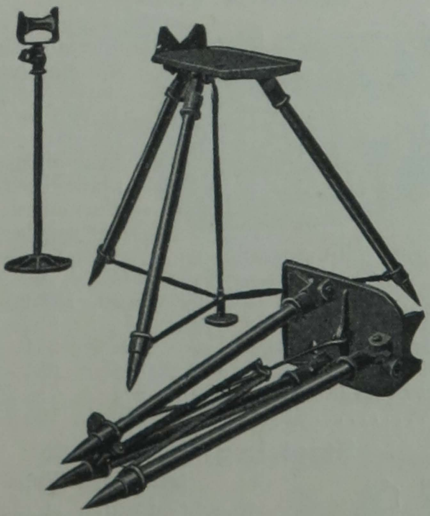
Trimo Chain Pipe Vises



Made of steel, drop-forged. Easy to carry and easy to set up on the job.

No.	1	2
Each	$7.00	$15.00
Capacity Pipe...in.	⅛–2½	¼–4
Wt.........lbs.	4	10
Jaws.........each	3.00	7.00
Chain with Screw.......each	2.50	4.80
Screw.........each	.80	1.40
Handle and Nut........each	2.20	4.20
Nut..........each	1.40	2.70

Toledo Vise Mounts and Roller Supports



The Toledo Vise Mount is made in three sizes, all of which are portable.

The roller support shown in the illustration may be purchased or not, according to the individual's desire, although the roller support should be used with the vise mount, especially in the larger sizes. The vise mount and roller support can be connected by using a length of ¾-inch pipe inserted through holes in both the vise mount and the roller support for that purpose.

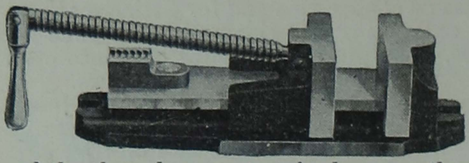
Vise Mounts

No.	For Pipe Inches	Ship. Wt. Pounds	Each
0	Up to 1	36	$7.20
1	Up to 2½	49	9.00
2	Up to 4½	85	10.80

Roller Supports

Price, Weight 18 Pounds.......................each $3.00

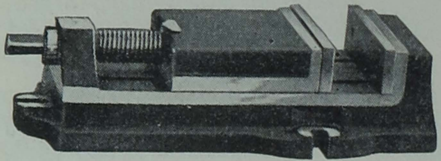
Greene Quick-Action Vises



Operates with ease and quickness. The screw cannot be forced out of the nut when under pressure, and the threads cannot strip, because they are deeply undercut. The strain is taken at the root of the threads and not at the top. A heavy cold rolled steel plate mounts the jaws and the nut and carries all of the clamping stresses. Removable high grade semi-steel jaws; nut of tough steel.

Cat. No.	Jaws, Inches — Width	Depth over Plate	Depth at Sides	Opening	Weight Pounds Each	Price Each
3B	3	1½	2	3	6½	**$6.00**
4B	4	1½	2½	4	14	**10.00**
6B	6	2	3	6	31	**16.00**

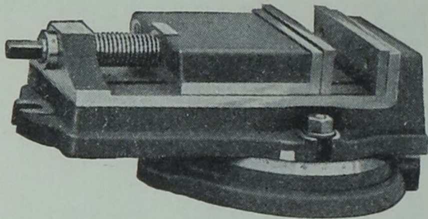
Kearney & Trecker Plain Milling Machine Vises



Flanged construction with cross slots and side ears so that it can be held either way on work table.

Size ....in.	6	7	8	9
Each	**$50.00**	**65.00**	**85.00**	**110.00**
Width Steel Jaws ....in.	6⅜	7⅜	8⅜	9⅜
Depth Steel Jaws ....in.	1½	2	2¼	2¾
Opens with Steel Jaws....in.	4⅛	5¼	6⅛	7 7/16
Opens without Steel Jaws..in.	5⅛	6¼	7⅛	8 7/16
Weight ....lbs.	60	95	130	200

Kearney & Trecker Swivel Milling Machine Vises

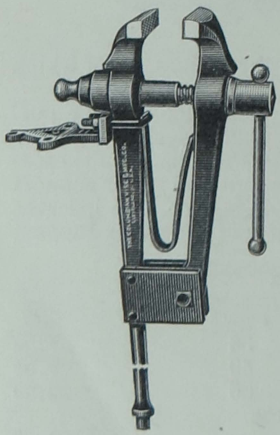


A plain vise with the addition of a circular base graduated in degrees. It can be removed from the circular base and used as a plain vise if desired. Furnished as part of regular equipment of universal milling machines.

Size ....in.	6	7	8	9
Each	**$65.00**	**85.00**	**105.00**	**135.00**
Width Steel Jaws ....in.	6⅜	7⅜	8⅜	9⅜
Depth Steel Jaws ....in.	1½	2	2¼	2¾
Opens with Steel Jaws...in.	4⅛	5¼	6⅛	7½
Opens without Steel Jaws.in.	5⅛	6¼	7⅛	8½
Weight ....lbs.	85	130	165	250

Steel Leg Vises

Standard Type



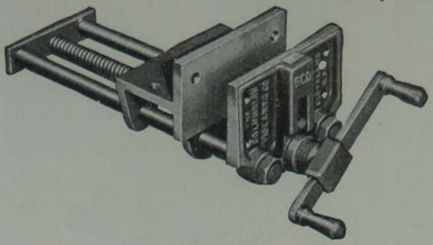
For blacksmith shops, farms, factories, service stations and garages.

Jaws are accurately forged from high grade steel. Head and jaw faces heat treated to secure proper hardness. Extra heavy malleable iron nut. U-bolt bench fastening and new type spring.

No.	Each	Width Jaw Inches	Jaws Open Inches	Approx. Weight Pounds
35	**$10.00**	4	3¾	35
50	**11.50**	4½	4½	50
70	**18.75**	5	5¼	70
100	**27.50**	6	6	100
150	**54.00**	7	7	150
200	**84.00**	8	8	200

Columbian Woodworkers' Vises

Continuous Screw, Solid Nut

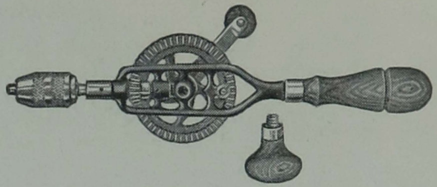


With Special All-Steel Handle

For general service in woodworking and manual training shops. For vise with larger opening, add 50 cents per inch.

No.	Each	Width Jaw Inches	Jaw Open Inches	Weight Pounds
Plain Front Jaws				
5C-S	**$8.50**	4x 7	9	24
3C-S	**10.50**	4x10	12	32
With Dog in Front Jaw				
5CD-S	**$9.50**	4x 7	9	25
3CD-S	**11.50**	4x10	12	33

No. 1 Millers Falls Hand Drills



Capacity, 0 to ¼-inch round shank drills. Three-jaw chuck, improved protected springs; single speed; ball thrust bearing; cut gears; steel pinion.

Detachable side handle, tropical hardwood hollow-end main handle containing eight wood boring points.

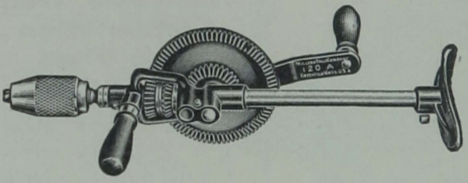
Black enameled malleable iron frame; red enameled large gear; other parts nickeled.

An easy running, exceptionally serviceable drill.

Length, 12½ inches.

No. **1**, with Drill Points........................each **$3.70**

No. 120A Millers Falls Breast Drills



Capacity, 0 to ½-inch round shanks.

Three-jaw chuck; improved protected springs; 2 speeds — gear ratio even and 3 to 1; changed by pressing spring and shifting large gear.

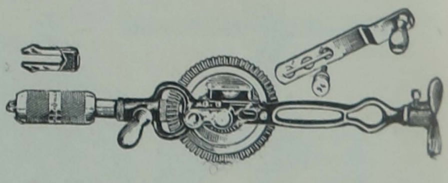
Ball thrust bearing; cut gears; steel pinion; adjustable breast plate. Rolled steel and cast iron frame; large gear enameled red; iron frame, breast plate and crank enameled black; other metal parts polished.

Length, 15⅝ inches.

Packed one in a box and 12 in a case. Weight, 5¼ pounds.

No. **120A**..each **$3.50**

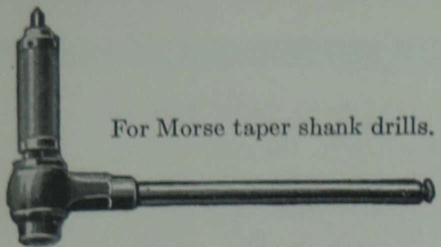
No 12 Millers Falls Breast Drills



Capacity ⅛ to ½-inch round bit and No. 1 Morse taper shanks. Two-jaw Master chuck; protected springs; two speeds—gear ratios even and 3 to 1; speed changed by pressing the spring and shifting large gear. Annular ball bearing spindle and ball thrust bearing with take up nut to provide for wear; cut gears; steel pinion; idler roll to equalize bearing. Stained hardwood handles; crank handle extensible, 4 to 6-inch radius. Black enameled malleable iron frame and adjustable breastplate; level attached. Red enameled large gear, other parts nickeled. Length 17½ inches. Weight 6½ pounds.

No. **12**..each **$6.00**

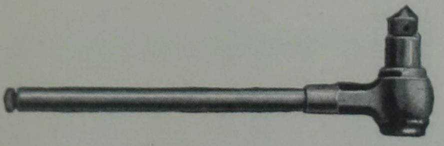
Keystone Reversible Morse Taper Ratchets



For Morse taper shank drills.

No.	Length Handle Inches	Morse Taper No.	Size Drills Inches	Height Head Inches	Length Feed Inches	Weight Pounds	Price Each
21A	9	1	1/16 to 9/16	5¼	1½	1 11/16	$5.00
21	10	2	37/64 to 29/32	6⅛	1¾	3 9/16	5.25
22	14	3	59/64 to 1¼	8 3/16	2¾	6½	6.00
24	18	4	1 17/64 to 2	9½	2¾	12	7.50
26	24	4	1 17/64 to 2	9½	2¾	12¾	8.00

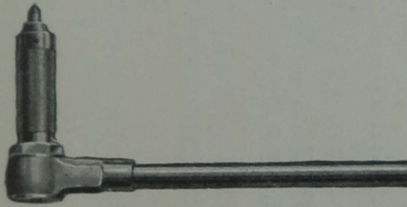
Keystone Reversible Boiler Ratchets



For square shank drills only.

No.	Length Handle Inches	Socket Will Take Drills	Height Head Inches	Length Feed Inches	Weight Pounds	Price Each
31A	9	Bit Stock Taper	3⅛	¾	1¼	$4.50
31	10	No. 1 Standard	3 13/16	1⅛	2⅞	5.00
32	14	Square Taper	4½	1½	5⅛	5.75
..	..	⅝x⅜x1½ In.	...	...	...	....
34	18	No. 2 Standard	5¼	2	9	7.25
..	..	Square Taper	...	...	...	....
36	24	¾x½x1¾ In.	5¼	2	10	7.75

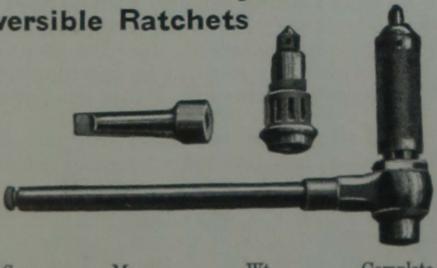
Keystone Reversible Square Sleeve Ratchets



For square taper shank drills only.

No.	Length Handle Inches	Socket Will Take Drills	Height Head Inches	Length Feed Inches	Weight Pounds	Price Each
1A	9	Bit Stock Taper	4 9/16	1½	1⅝	$4.75
1	10	No. 1 Standard	5 5/16	1¾	3½	5.00
2	14	Square Taper	7 5/16	2¾	6⅝	5.75
		⅝x⅜x1½ In.				
4	18	No. 2 Standard	8⅜	2¾	12½	7.25
..	..	Square Taper	...	...	...	....
6	24	¾x½x1¾ In.	8⅜	2¾	13½	7.75

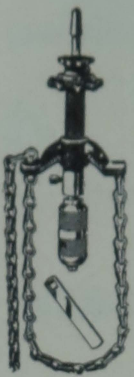
No. 200 Combination Keystone Reversible Ratchets



Has ratchet for taper shank twist drill; sleeve for square shank drills; short boiler socket for square shank drills. Sockets are interchangeable.

No.	Length Handle, In.	Square Taper No.	Morse Taper No.	Wt. Lbs.	Complete Price, Each
51A	9	Bit Stock	1	2¼	$7.00
51	10	1	2	4⅞	7.75
52	14	1	3	9	9.00
54	18	2	4	16½	11.25
56	24	2	4	17½	11.75

No. 718 Millers Falls Chain Drills



For use with a breast drill or bit brace in metal drilling. In operation the drill is fed into the work automatically by means of an adjustable friction feed. The speed of the feed is automatically regulated by the resistance the drill encounters, which reduces drill breaking to a minimum. Hand feed can be used when desired.

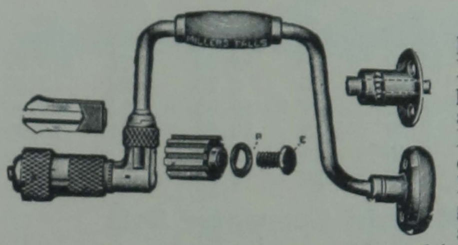
Has master chuck for holding bitstock shanks, round shanks from ⅛ to ½ inch and No. 1 Morse taper shanks.

Four feet of stout chain is furnished with each chain drill. Polished chuck and black japanned main casting.

Length, with chuck inserted, 11½ inches. Weight, 4½ pounds.

No. 718........................each $5.20

Millers Falls Ratchet Bit Braces

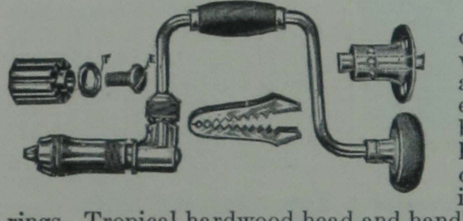


Has cocobolo head and handle. Exposed metal parts nickel plated and buffed. Has Lion ball bearing chuck and jaws have parallel milled grooves which grip along their entire length. Holds bit shanks, round from ⅛ to ½ inch and No. 1 Morse taper shanks. Boxed ratchet.

Packed 2 in a box.

No........................	769	770	771	772	773
Each......................	$6.75	6.40	6.25	6.10	6.10
Sweep..............inches	16	14	12	10	8
Weight per Box......pounds	9	8	7	6¾	6

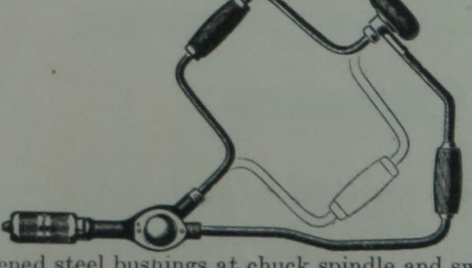
Millers Falls Ratchet Bit Braces



Holds bit shanks only. Barber chuck with forged steel alligator jaws. Boxed ratchet. Ball-bearing steel clad head, with steel quill. Handle has inserted metal rings. Tropical hardwood head and handle. Exposed metal parts are nickel-plated and buffed. This brace will fulfill every boring requirement where bit shanks only are used. Packed ⅙ dozen in a box.

No.	Sweep Inches	Wt., Lbs. per ⅙ Doz.	Price Each	No.	Sweep Inches	Wt., Lbs. per ⅙ Doz.	Price Each
30	14	6¾	$5.25	33	8	5	$4.80
31	12	6	5.00	34	6	4½	4.80
32	10	5¾	4.80	..	.	...	....

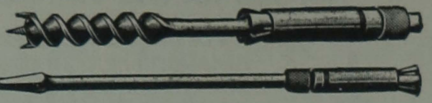
Millers Falls Corner Braces



Capacity, ⅛ to ½-inch round, bit shanks and No. 1 Morse taper shanks. Master chuck. Case hardened gears, enclosed for protection. Ball thrust bearing at base of chuck. Hardened steel bushings at chuck spindle and sweep. Ball bearing head. Stained hardwood handles, free acting, with inserted metal rings. Exposed metal parts nickel-plated, hub casting japanned. Length, 17 inches. Packed 2 in a box.

No.	Each	Sweep In.	Wt. Lbs. per ⅙ Doz.	No.	Each	Sweep In.	Wt. Lbs. per ⅙ Doz.
502	$9.40	10	8	503	$9.40	8	6¼

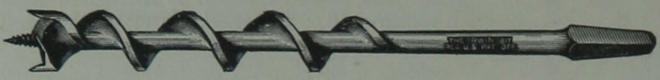
No. 5 Millers Falls Bit Extensions



For following ⅝-inch bit or larger into its bore, but not recommended for bits larger than 11/16ths. Special tool steel chuck. Packed one in a box.

Lgth. In.	Each	Lgth. In.	Each	Lgth. In.	Each
12	**$2.15**	18	**$2.15**	24	**$2.35**
15	**2.15**	21	**2.20**	30	**2.45**

No. 62T Irwin Standard Solid Center Auger Bits

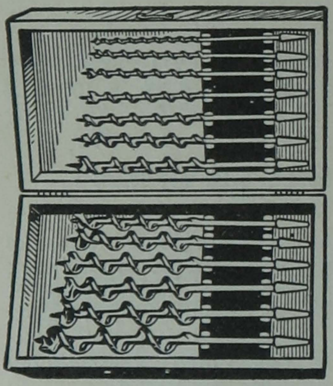


Extension lip, double cutter.

Sizes one inch and under packed 6 in a box; over one inch, 3 in a box.

Size in 16ths	Per Dozen	Size in 16ths	Per Dozen	Size in 16ths	Per Dozen	Size in 16ths	Per Dozen
3	**$4.50**	9	**$5.50**	15	**$9.00**	21	**$13.50**
4	**4.00**	10	**6.00**	16	**9.00**	22	**13.50**
5	**4.00**	11	**7.00**	17	**10.50**	23	**15.00**
6	**4.00**	12	**7.00**	18	**10.50**	24	**15.00**
7	**4.50**	13	**8.00**	19	**12.00**	..	.....
8	**5.00**	14	**8.00**	20	**12.00**	..	.....

No. DM Irwin Carpenter Sets



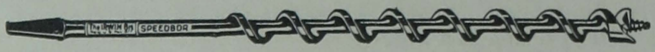
Mainbor cutting head has screw with pitch of thread for general work, spurs for outlining smooth hole, cutters with material for long life and throats open for flow of chips.

Irwin Mainbor Auger Bits 62-T in sizes 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16-16. Total, 32½ quarters.

No. DM, in Bor-chest........per set **$7.75**

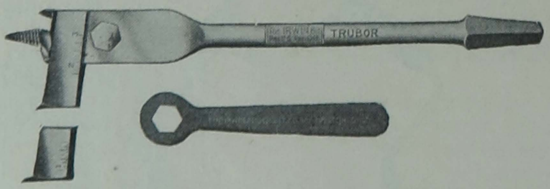
No. 3-E Speedbor Electricians' Bits

Brace Chuck Shank



Size in 16ths Inch	Lgth. Twist In.	Lgth. Over All, In.	Price per Doz.	Size in 16ths Inch	Lgth. Twist In.	Lgth. Over All, In.	Price per Dozen
10	6	10	**$3.60**	**11**	6	10	**$3.60**
10½	6	10	**3.60**	..	.	..	....

Irwin-Trubor Expansion Bits



This bit eliminates loose plates and holds the blade in a solid clamping device which is part of the head.

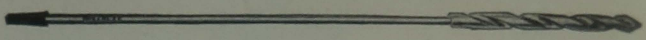
Made of special steel, heat-treated; blades are tempered. Packed one in a box; 6 in a carton.

No. **1**, Cuts ⅝ to 1½ Inches..............per dozen **$18.00**
No. **2**, Cuts ⅞ to 3 Inches...............per dozen **26.00**

Extra Blades

No.		1	2
For No. 1 Expansion Bit	per dozen	**$3.00**	**$3.75**
For No. 2 Expansion Bit	per dozen	**5.25**	**6.00**

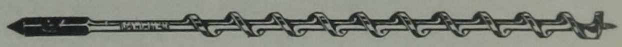
No. 48 Greenlee Bell Hanger Drills



Made with twist about 3¾ inches long.
Packed in bundles.
The numbers indicate the sizes in 32nds.

	Price, per Dozen			
	Length, Inches			
No.	12	18	24	30
6	**$7.50**	**$10.00**	**$12.50**	**$15.00**
8	**8.00**	**10.50**	**13.00**	**15.50**
10	**8.75**	**11.00**	**13.50**	**16.00**
12	**9.50**	**12.00**	**14.50**	**17.00**
14	**10.50**	**13.00**	**15.50**	**18.00**
16	**12.00**	**14.50**	**17.00**	**19.50**
18	**13.50**	**16.00**	**18.50**	**21.00**
20	**15.25**	**17.75**	**20.25**	**22.75**
22	**17.00**	**19.50**	**22.00**	**24.50**
24	**19.00**	**21.50**	**24.00**	**26.50**
26	**21.00**	**23.50**	**26.00**	**28.50**
28	**23.00**	**25.50**	**28.00**	**30.50**
30	**25.00**	**27.50**	**30.00**	**32.50**
32	**27.50**	**30.00**	**32.50**	**35.50**
36	**33.00**	**36.00**	**39.00**	**42.50**

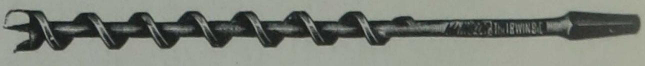
No. 55-S Solid Center Ship Augers



Recommended for heavy construction and repair work. Length over all, 18 inches, with a twist of 12 inches and a shank of 6 inches. Sizes up to 16/16ths inclusive, are packed 6 in a box. Larger sizes are packed 3 in a box.

Size, In.		Wt., Lbs. per doz.	Per Dozen	Size, In.		Wt., Lbs. per Doz.	Per Dozen
16ths	Fractions			16ths	Fractions		
6	3/8	3	**$7.50**	**16**	1	12	**$13.50**
7	7/16	3	**7.50**	**17**	1 1/16	13	**15.00**
8	1/2	4	**7.50**	**18**	1 1/8	14	**15.00**
9	9/16	5	**9.00**	**19**	1 3/16	15	**16.50**
10	5/8	6	**9.00**	**20**	1 1/4	16	**16.50**
11	11/16	7	**10.50**	**21**	1 5/16	17	**18.00**
12	3/4	8	**10.50**	**22**	1 3/8	19	**18.00**
13	13/16	9	**12.00**	**23**	1 7/16	20	**21.00**
14	7/8	11	**12.00**	**24**	1 1/2	21	**21.00**
15	15/16	11	**13.50**	..	...	..	.....

No. 65-T Irwin Mainbor Car Bits



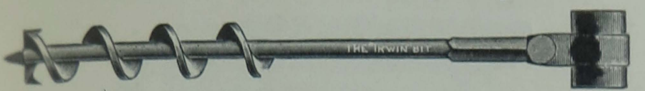
Mainbor, 18 inches; stock No. 65-T, for smooth work.

An easy running car bit. Can be used in the general range of woods. Length over all, 18 inches; twist, 12 inches; shank, 6 inches. Has a bright, durable oil finish except square of shank which is a natural forged black. Polish is protected when leaving factory by a thin coat of oil.

Half sizes take the same list and discount as the next larger size, but also take a special set up charge.

Size in 16ths	Per Dozen	Average Lgth. Over All, In.	Average Length Twist, In.	Size in 16ths	Per Dozen	Average Lgth. Over All, In.	Average Length Twist, In.
4	**$9.00**	18	12	**13**	**$17.50**	18	12
5	**9.00**	18	12	**14**	**19.00**	18	12
6	**9.00**	18	12	**15**	**20.50**	18	12
7	**10.00**	18	12	**16**	**22.00**	18	12
8	**11.25**	18	12	**17**	**24.00**	18	12
9	**12.50**	18	12	**18**	**26.00**	18	12
10	**13.75**	18	12	**19**	**28.00**	18	12
11	**15.00**	18	12	**20**	**30.00**	18	12
12	**16.25**	18	12	..	.....	..	..

No. 78-0 Irwin Rafting Augers



Designed for deep boring.

The auger is 32 inches long. The twist is 12 inches and the shank 20 inches.

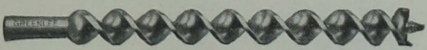
Furnished in two finishes: Bright polish with exception of the ring and the round of the shank; black enamel with exception of the edges of the twist, which are polished.

Each auger is wrapped individually in two coats of rust-resisting paper.

Sizes in 16ths of an Inch	Price per Dozen	Sizes in 16ths of an Inch	Price per Dozen
16	$24.00	28	$48.00
20	32.00	32	56.00
24	40.00	..	.....

Yates-American Machine Bits

Double Spur Machine Bits



Twist In.	Shank In.	Size by 16ths In.	Twist In.	Shank In.	Size by 16ths In.
4	½x2¼	4/16—1	8	¾x2¼	5/16—1
6	½x2¼	4/16—1⅛	10	¾x2¼	⅜—1⅛
10	½x2¼	5/16—1⅛	12	¾x2¼	⅜—2
12	½x2¼	⅜—2	14	¾x2¼	⅜—2
14	½x2¼	9/16, 11/16, 13/16, 15/16 and 1 1/16	16	¾x2¼	9/16, 11/16, 13/16, 15/16 and 1 1/16

Extension Lip Machine Bits

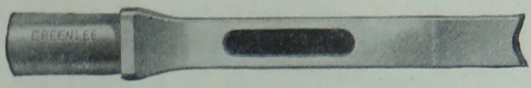
Twist In.	Shank In.	Size by 16ths In.	Twist In.	Shank In.	Size by 16ths In.
4	½x2¼	¼—1	6	½x2¼	¼—1¼

Prices

Size in 16ths	4 & 6-In. Twist Each	8-In. Twist Each	10-In. Twist Each	12-In. Twist Each	14-In. Twist Each	Ea. Ex. 2-In. Twist
4	$.90	$1.08	$1.26	$1.44	....	...
5	.90	1.08	1.26	1.44	....	...
6	.90	1.08	1.26	1.44	....	...
7	.90	1.08	1.26	1.44	....	...
8	.90	1.08	1.26	1.44	$1.62	$.18
9	1.00	1.20	1.40	1.60	1.80	.20
10	1.10	1.32	1.54	1.76	1.98	.22
11	1.20	1.44	1.68	1.92	2.16	.24
12	1.30	1.56	1.82	2.08	2.34	.26
13	1.40	1.68	1.96	2.24	2.52	.28
14	1.50	1.80	2.10	2.40	2.70	.30
15	1.60	1.92	2.24	2.56	2.88	.32
16	1.70	2.04	2.38	2.72	3.06	.34
17	1.80	2.16	2.52	2.88	3.24	.36
18	1.90	2.28	2.66	3.04	3.42	.38
19	2.00	2.40	2.80	3.20	3.60	.40
20	2.10	2.52	2.94	3.36	3.78	.42
21	2.20	2.64	3.08	3.52	3.96	.44
22	2.30	2.76	3.22	3.68	4.14	.46
23	2.40	2.88	3.36	3.84	4.32	.48
24	2.50	3.00	3.50	4.00	4.50	.50
25	2.63	3.15	3.68	4.20	4.73	.53
26	2.75	3.30	3.85	4.40	4.95	.55
27	2.88	3.45	4.03	4.60	5.18	.58
28	3.00	3.60	4.20	4.80	5.40	.60
29	3.13	3.75	4.38	5.00	5.63	.63
30	3.25	3.90	4.55	5.20	5.85	.65
31	3.38	4.05	4.73	5.40	6.08	.68
32	3.50	4.20	4.90	5.60	6.30	.70
33	3.65	4.38	5.11	5.84	6.57	.73
34	3.80	4.56	5.32	6.08	6.84	.76
35	3.95	4.74	5.53	6.32	7.11	.79
36	4.10	4.92	5.74	6.56	7.38	.82
37	4.25	5.10	5.95	6.80	7.65	.85
38	4.40	5.28	6.16	7.04	7.92	.88
39	4.55	5.46	6.37	7.28	8.19	.91
40	4.70	5.64	6.58	7.52	8.46	.94
42	5.05	6.06	7.07	8.08	9.09	1.01
44	5.40	6.48	7.56	8.64	9.72	1.08
46	5.75	6.90	8.05	9.20	10.35	1.15
48	6.10	7.32	8.54	9.76	10.98	1.22

Sizes not listed are not carried in stock and are considered special, governed by special prices.

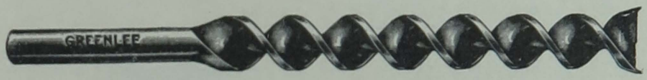
No. 6 Yates-American Hollow Chisels



Length of blade, 6½ inches.

Square, Size Inches	Each	Shank Inches	Depth of Mortise, Inches
⅜	$7.20	1⅛x2	3¼
½	8.00	1⅛x2	3½
⅝	8.80	1⅛x2	5⅛
¾	9.60	1⅛x2	5⅛
⅞	10.45	1⅜x2	5
1	11.30	1⅜x2	5½
1⅛	12.40	1⅜x2	5½
1¼	13.40	1¾x2	5
1⅜	14.60	1¾x2	5¼
1½	15.80	1¾x2	5¼
1¾	18.70	2¼x2	5
2	22.00	2¼x2	5

No. 6B Yates-American Chisel Bits



Length over all, 9-in. twist, 12 in.; 10-in. twist, 14 in.

Size Inches	9-In. Twist Each	10-In. Twist Each	Shank Inches
⅜	$1.50	$1.75	19/64x3 or 4
½	1.50	1.75	19/64x3 or 4
⅝	1.75	2.00	½ x3 or 4
¾	2.00	2.40	⅝ x3 or 4
⅞	2.40	2.80	⅝ x3 or 4
1	2.75	3.25	⅝ x3 or 4
1⅛	3.00	3.50	⅝ x3 or 4
1¼	3.30	3.70	⅝ x3 or 4
1⅜	3.65	3.90	⅝ x3 or 4
1½	3.90	4.25	⅝ x3 or 4
1¾	4.70	4.80	⅝ x3 or 4
2	5.30	5.70	⅝ x3 or 4

Yates-American Mortising Chisels and Bits

No. 4 Hollow Chisel 4-In. Blade				No. 4B Chisel Bit 6-In. Twist—9 In. Over All			
Square, Size In.	Each	Shank In.	Depth of Mortise In.	Size In.	Each	Shank In.	Twist In.
¼	$4.40	⅝x1½	1⅞	¼	$1.20	3/16x5¾	4
5/16	4.40	⅝x1½	1⅞	5/16	1.20	¼x5¾	4
⅜	4.40	⅝x1½	3¼	⅜	1.20	19/64x3	6
7/16	4.80	⅝x1½	3¼	7/16	1.20	19/64x3	6
½	5.25	⅝x1½	3¼	½	1.20	19/64x3	6
9/16	5.65	¾x1½	3¼	9/16	1.35	19/64x3	6
⅝	6.05	¾x1½	3¼	⅝	1.50	19/64 or ½x3	6
11/16	6.50	¾x1½	3¼	11/16	1.70	19/64 or ½x3	6
¾	6.90	1⅛x1½	3¼	¾	1.80	19/64 or ½x3	6
13/16	7.35	1⅛x1½	3¼	13/16	1.95	19/64 or ½x3	6
⅞	7.80	1⅛x1½	3¼	⅞	2.20	19/64 or ½x3	6

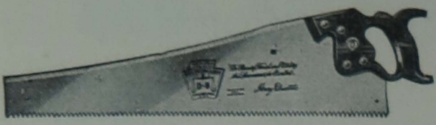
No. 5 Hollow Chisel 5-In. Blade				No. 5B Chisel Bit 7-In. Twist—10 In. Over All		
Size In.	Each	Shank In.	Depth of Mortise In.	Size In.	Each	Shank In.
⅜	$5.80	⅝x1½	4¼	⅜	$1.35	19/64x3
7/16	6.20	⅝x1½	4¼	7/16	1.35	19/64x3
½	6.60	⅝x1½	4¼	½	1.35	19/64x3
9/16	7.05	¾x1½	4¼	9/16	1.45	19/64x3
⅝	7.45	¾x1½	4¼	⅝	1.60	19/64 or ½x3
¾	8.25	1⅛x1¾	3¾	¾	1.90	19/64 or ½x3
⅞	9.10	1⅜x1¾	3¾	⅞	2.30	½x3
1	9.90	1⅜x1¾	3¾	1	2.60	½x3
1⅛	10.75	1⅜x1¾	3¾	1⅛	2.85	½x3
1¼	11.60	1⅜x1¾	3¾	1¼	3.10	½x3

No. 3B Hollow Chisel Bit is carried in stock in ¼, 5/16, and ⅜-inch diameters with 4¾-inch twist, 8 inches over all. Each, $1.20.

No. 3 Hollow Chisel, with 2¾-inch straight blade, is carried in stock in ¼, 5/16 and ⅜-inch sizes with a standard ⅝-inch shank. Each, $3.50.

No. D-8 Disston Skew-Back Hand Saws

Regular Pattern



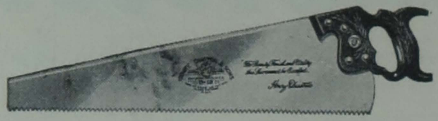
Cover-top handle of applewood; weatherproof finish; 5 brass screws in 26-inch length; 4 brass screws in 24-inch and shorter lengths. Thumb hole in handle of 26-inch rip saw. Blade is of Disston steel, hardened and tempered; high polish; striped back.

Width of 26-inch blade: Butt, 7⅛ inches; point 2 11/16 inches; other lengths in proportion. Packed 4 in a box.

Lgth. Blade In.	Cross-Cut No. Points per Inch	Cross-Cut Per Doz.	Rip No. Points per Inch	Rip Per Doz.	Approx. Wt. Lbs. per Doz.
20	8, 10, 12	$36.00	....	.....	14
22	8, 10, 12	36.00	7	$36.00	17
24	7, 8, 9, 10, 11	39.00	6, 7	39.00	20
26	6, 7, 8, 9, 10, 11	39.00	5, 5½, 6	39.00	24

No. D-12 Disston Straight-Back Hand Saws

Regular Pattern

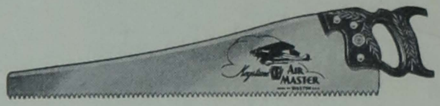


Cover-top applewood handle, carved; weatherproof finish. Nickel plated screws. Disston-made steel blade with true taper grind. Width of 26-inch blade at butt 7¼ inches, at point 2¼ inches. Other lengths in proportion.

Packed 4 in box.

	Crosscut		Rip
Lgth. Blade....in.	24	26	26
Per Doz..........	$58.00	58.00	58.00
Points per In......	7, 8, 9, 10, 11	6, 7, 8, 9, 10, 11	5½, 6
Wt. per Doz...lbs.	20	24	24

No. K-4 Keystone Air Master Hand Saws



This is a skew-back saw. Has thin back, teeth bevel filed. Mahogany color, weatherproof finish, full carved handle. Four nickel plated screws, one a medallion.

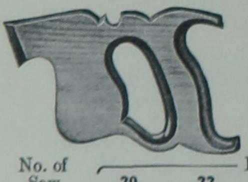
Length, 26 inches.

Packed 4 in a box.

Weight per dozen, 22 pounds.

	Cross-Cut	Rip
No. K-4............................each	$1.75	1.75
No. of Points...........................	7 and 8	5½

Disston Saw Handles



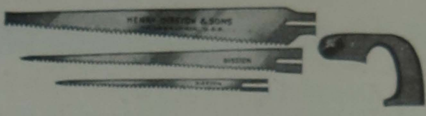
All slit and bored except Nos. 25 and 66, which are slit only.

Packed one dozen in a box.

No. of Saw	Length, In. 20	22	24	26	26 Rip	Kind of Wood	Wt. Lbs. Per Doz.
*D- 7	†$7.35	†$7.35	†$7.35	†$7.50	.....	Beechwood	6¾
**D- 7	8.10	8.10	8.10	8.25	.....	Beechwood	6¾
*D- 8	9.25	9.60	9.60	10.50	†$12.00	Applewood	7¼
**D- 8	10.50	10.85	10.85	12.00	13.50	Applewood	7¼
**D- 12	.....	.....	13.50	15.00	.....	Applewood	6
**D- 15	.....	.....	25.00	25.00	.....	Rosewood	6
**D- 17	.....	.....	.....	9.00	.....	Beechwood	6¾
**D- 23	.....	.....	12.00	13.50	.....	Applewood	6
**D-115	.....	.....	.....	25.00	.....	Rosewood	6
*25	.....	.....	.....	5.75	.....	Cherry	6¾
*66	3.60	.....	.....	4.00	.....	Beechwood	6¾

*Varnished finish. **Weatherproof finish. †Per dozen.

No. 3 Disston Nest of Saws



No. 3 Nest Complete, Weight, 10 Pounds. .per dozen $23.00

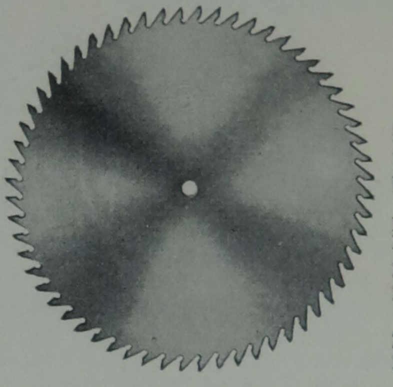
Blades

Length..........................inches	10	14	16
Keyhole......................per dozen	$3.90	.....	.....
Compass.....................per dozen	....	$5.50	.....
Pruning.......................per dozen	....	....	$9.10
Points to Inch................................	10	8	8
Weight per Dozen...............pounds	¾	2	3

Handles

Handle and Tightener, Weight 4¼ Pounds. ....per dozen $6.30

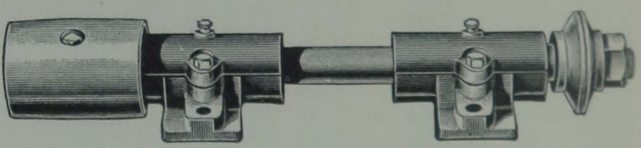
Cord Wood Circular Saws



Made of special steel. Satisfactory for farm work and similar purposes.

Diam. In.	Each	Gage	Arbor In.	No. Teeth
24	$5.15	11	1⅜	60
26	6.00	11	1⅜	64
28	7.00	10	1⅜	70
30	8.00	10	1⅜	76

Champion Ring Oiling Saw Mandrels



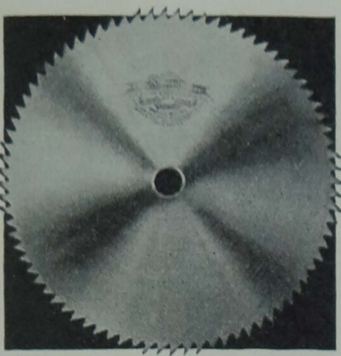
Champion Saw Mandrels are extra heavy, and are fitted with rigid ring oiling pillow blocks, which construction insures adequate oiling.

No. 000 made with solid cast iron bearings.

The arbors are built of high grade machinery steel, fitted with heavy flanges. Pulleys are crowned and are always shipped on right-hand side when saw is running toward the operator, with left-hand thread unless otherwise ordered. Pulley can be furnished on left-hand side or on center if specially ordered.

No.	Each	Diam. Pulley Inches	Face Pulley Inches	Diam. Flange Inches	Diam. Shaft Inches	Size Hole in Saw Inches	Length Shaft Inches	Ship. Wt. Lbs.
000	$2.20	2	1⅝	2	½	½	12	7
00	2.50	2	2½	2	¾	½	12	8
0	3.00	2	3	2½	⅞	¾	20	14
1	4.10	2½	3½	3	1 1/16	1	20	22
2	4.60	3	4	3	1 3/16	1⅛	23	30
3	6.70	3½	4½	3½	1 5/16	1¼	25	35
4	7.80	4	5	4½	1 7/16	1 5/16	28	40
5	9.25	4½	5½	4½	1 7/16	1 5/16	30	45
6	9.75	5	6	5	1 7/16	1⅜	32	50
6½	11.50	5	6	5	1 7/16	1⅜	48	55
7	10.30	5½	6½	5½	1 7/16	1⅜	34	60
8	12.35	6	7	6	1 9/16	1½	36	70
9	14.55	7	8	6	1 11/16	1½	41	90
10	16.45	8	8	6	1 13/16	1⅝	45	110
11	24.70	9	10	6	2 3/16	2	45	150

Solid Tooth Circular Saws



These saws are filed and set ready for use. Made in both cross cut and rip. When ordering specify kind desired.

Diam. Inches	Base Gauge	Each	Extra for Each Gauge Heavier	Beveling New Saws Extra per Gauge
6	18	$3.30	$.07	$.25
8	18	4.40	.10	.35
10	16	5.60	.20	.45
12	15	7.00	.30	.55
14	14	8.50	.40	.65
16	14	10.50	.50	.75
18	13	12.50	.60	.90
20	13	15.00	.75	1.05
22	12	17.50	.90	1.20
24	11	20.50	1.05	1.35
26	11	24.00	1.25	1.55
28	10	28.00	1.50	1.75
30	10	32.00	1.75	1.95
32	10	36.50	2.00	2.15
34	9	41.00	2.25	2.35
36	9	47.00	2.60	2.55
38	9	54.00	3.00	2.75
40	9	62.00	3.40	2.95
42	8	71.00	3.80	3.25
44	8	83.00	4.40	3.55
46	8	98.00	5.15	3.85
48	8	112.00	5.90	4.15
50	7	127.00	6.65	4.45
52	7	142.00	7.40	4.80
54	7	157.00	8.80	5.15
56	7	180.00	10.25	5.50
58	7	200.00	11.75	5.95
60	6	224.00	13.25	6.40
62	6	250.00	14.75	6.85
64	6	280.00	17.60	7.35
66	6	310.00	22.00	7.85
68	5	350.00	26.40	8.45
70	5	400.00	30.80	9.05
72	5	450.00	35.20	9.65
74	5	510.00	39.60	10.30
76	5	575.00	44.00	11.00
78	5	690.00	49.85	11.85
80	5	810.00	55.75	12.90
82	5	940.00	63.05	14.10
84	5	1075.00	70.40	15.40

All saws less than six inches in diameter take list of six-inch saw. All saws of odd diameters not listed take list of next larger size.

No extra charge for saws one gauge thicker than list.

No extra charge for saws one to three gauges thinner than list; when more than three gauges thinner than list, add five per cent for each gauge.

Saws 48 inches and under, and 62 inches and over, in diameter, more than two gauges thinner than list, not warranted. Saws 50 to 60 inches in diameter thinner than 10 gauge, not warranted.

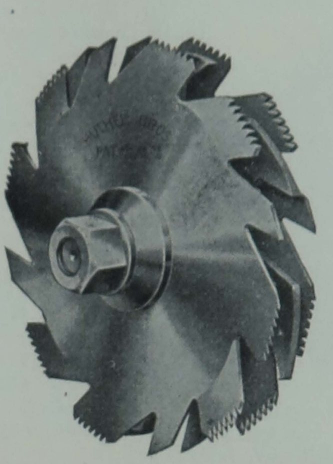
Saws 42 inches or less in diameter beveled one gauge without extra charge; 44 inches or larger beveled two gauges without extra charge.

Saws hollow or concave ground, add for each gauge hollow or concave ground, double the list for beveling.

Saws for cutting bone, horn, ivory, pearl, bakelite, celluloid, fibre, formica, micarta, paper, rubber and similar materials.

Prices on application.

Huther Patent Groovers or Dado Heads



Can be used on any circular saw arbor for cutting any width groove from 1/8 to 4 inches.

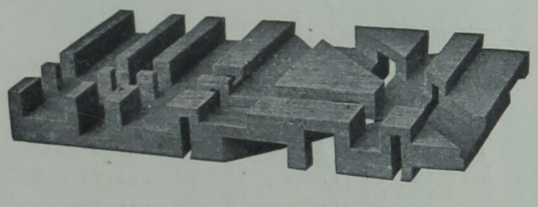
This groover consists of two outside saws, each of which is a groover in itself, and as many inside cutters as required.

The inside cutters are made 1/16, 1/8 and 1/4 inch thick, so that any width groove measurable in sixteenths may be cut. The outside cutters are made 1/8 inch thick.

This groover will cut a perfect groove, either with or across the grain, and will not leave a rough edge.

The outside cutters can be used singly, together, or in connection with as many or as few inside cutters as required to cut the necessary width groove. Cutters are jointed and filed ready for use.

Extra inside cutters can be furnished promptly.



Showing Grooves Cut

Groovers are arranged in sets as follows:

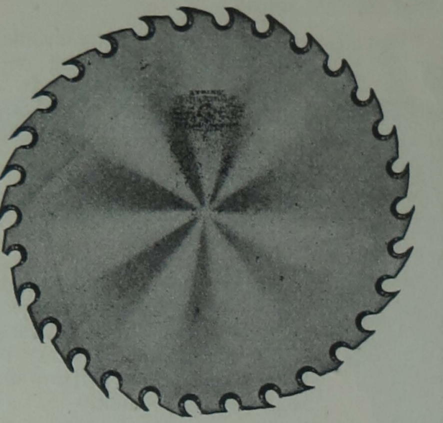
Set No.	Cuts Grooves	Set No.	Cuts Grooves
1	1/8 to 3/8 by 1/8 in.	5	1/8 to 1 1/2 by 1/16 in.
2	1/8 “ 5/8 “ 1/8 “	6	1/8 “ 2 “ 1/16 “
3	1/8 “ 3/4 “ 1/16 “	7	1/8 “ 3 “ 1/16 “
4	1/8 “ 1 “ 1/16 “	8	1/8 “ 4 “ 1/16 “

Diam. In.	PRICE, PER SET No. 1	No. 2	No. 3	No. 4
6	$11.50	$13.85	$16.60	$18.90
7	13.15	15.65	18.65	21.15
8	14.85	17.50	20.85	23.50
9	16.50	19.35	23.00	25.85
10	19.00	22.00	26.00	29.00
11	21.65	24.85	29.15	32.35
12	25.15	28.65	33.35	36.85
14	29.65	34.00	39.35	43.65
16	34.50	39.85	45.65	51.00
18	37.15	43.15	50.00	56.00
20	43.85	50.35	58.35	65.85

Diam. In.	PRICE, PER SET No. 5	No. 6	No. 7	No. 8
6	$23.60	$28.25	$37.60	$46.90
7	26.15	31.15	41.15	51.15
8	28.85	34.15	44.85	55.50
9	31.50	37.15	48.50	59.85
10	35.00	41.00	53.00	65.00
11	38.65	45.00	57.65	70.35
12	43.85	50.85	64.85	78.85
14	52.35	61.00	78.35	95.65
16	61.65	72.35	93.65	115.00
18	68.00	80.00	104.00	126.65
20	80.85	95.85	125.85	155.85

In ordering please state the number of set, diameter of groover and size of hole wanted.

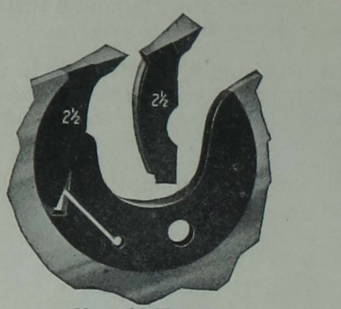
Inserted Tooth Circular Saws



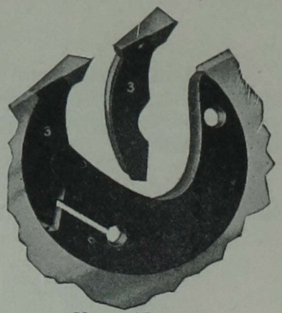
No. 3 style of tooth is most generally used. No. 2½ is of medium size and suitable for saws for high feed mills where a large number of teeth is necessary, and for small saws in light gauges. No. 30 is an especially strong tooth for heavy duty.

Bits or teeth are made from a high grade alloy steel, combining both great strength and edge holding qualities.

One extra set teeth or bits, two extra holders or shanks and one wrench are given with each saw.



No. 2½ Tooth



No. 3 Tooth

Diam. In.	Thick. Gauge at Rim	Size Hole In.	No. 2½ Std. No. Teeth	No. 2½ Greatest No. Teeth	Nos. 3 and 30 Std. No. Teeth	Nos. 3 and 30 Greatest No. Teeth	Price, Each No. 2½	Price, Each Nos. 3 and 30	Extra for Each Gauge Heavier	Price Beveling New Saws per Gauge
10	12	1	10	10	..	..	$27.00	......	$.20	$.45
12	11	1	12	12	..	..	32.00	......	.30	.55
14	10	1⅛	14	14	..	..	37.00	......	.40	.65
16	10	1⅛	16	16	12	12	43.00	$39.00	.50	.75
18	10	1¼	18	20	14	14	49.00	44.00	.60	.90
20	9	1⁵⁄₁₆	20	22	14	16	55.00	50.00	.75	1.05
22	9	1⁵⁄₁₆	22	24	16	18	61.00	56.00	.90	1.20
24	9	1⅜	24	26	18	18	68.00	62.00	1.05	1.35
26	9	1⅜	26	28	18	20	75.00	68.00	1.25	1.55
28	9	1½	28	30	18	22	82.00	74.00	1.50	1.75
30	9	1½	30	32	20	24	90.00	80.00	1.75	1.95
32	8	1⅝	32	34	22	26	100.00	88.00	2.00	2.15
34	8	1⅝	36	36	22	28	110.00	97.00	2.25	2.35
36	8	1⅝	38	38	24	30	120.00	106.00	2.60	2.55
38	8	1⅝	40	42	24	32	130.00	115.00	3.00	2.75
40	8	2	42	44	26	34	140.00	125.00	3.40	2.95
42	8	2	44	46	28	36	150.00	137.00	3.80	3.25
44	8	2	46	50	30	38	165.00	150.00	4.40	3.55
46	8	2	48	52	32	40	180.00	165.00	5.15	3.85
48	8	2	50	54	34	42	200.00	180.00	5.90	4.15
50	8	2	52	56	36	44	220.00	200.00	6.65	4.45
52	7	2	56	60	38	44	245.00	220.00	7.40	4.80
54	7	2	58	62	40	46	275.00	250.00	8.80	5.15
56	7	2	60	64	42	48	310.00	280.00	10.25	5.50
58	7	2	62	66	44	50	340.00	310.00	11.75	5.95
60	7	2	64	70	46	52	375.00	340.00	13.25	6.40
62	6	2	66	74	48	54	420.00	380.00	14.75	6.85
64	6	2	68	76	48	56	470.00	425.00	17.60	7.35
66	6	2	72	78	50	58	520.00	470.00	22.00	7.85
68	6	2	76	80	52	60	575.00	520.00	26.40	8.45
70	6	2	78	82	54	62	630.00	570.00	30.80	9.05
72	6	2	80	84	56	64	685.00	620.00	35.20	9.65

No extra charge for saws one gauge thicker than list. No extra charge for saws one to three gauges thinner than list. When more than three gauges thinner, add 5 per cent to list for each gauge. Saws 48 inches and under, and 62 inches and over in diameter, more than two gauges thinner than list not warranted. Saws 50 to 60 inches in diameter thinner than 10 gauge not warranted. Saws 42 inches or less in diameter beveled one gauge without extra charge; 44 inches or larger beveled two gauges without extra charge.

Bits or teeth $4.50 per hundred, net; extra holders or shanks $.40 each, net.

Hoe Teeth and Holders for Other Makes of Saws

Bits

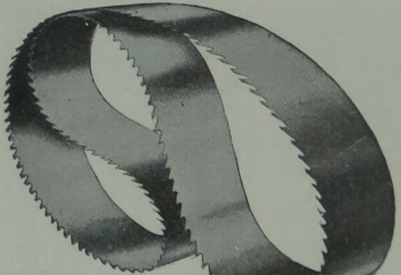
Genuine Hoe bits, with drop-forged groove, are assured an absolute central bearing in the plate, giving uniform clearance and consequent longer wear, and are of even temper and uniform finish. They do not split when inserted, nor break when used.

Hoe No.	Per 100	Fits Saws	Saw No.
2	$5.50	Atkins	2
2	5.50	Disston	4½
2½	5.50	Atkins	2½
2½	5.50	Disston	6
3	5.50	Atkins	3
3	5.50	Disston	7
33	5.50	Disston	33
44	5.50	Disston	44
6	5.50	Disston	3
B	5.50	Simonds Styles B, D and F	....

Shanks

Hoe No.	Each	Size	Fits Saw	Saw No.
2	$.50	...	Atkins	2
2	.50	3rd	Disston	4½
2½	.50	...	Atkins	2½
2½	.50	...	Disston	6
3	.50	2nd	Atkins	3
3	.50	...	Disston	7
4	.55	...	Atkins	4
4	.55	...	Disston	8
33	.50	...	Disston	33
44	.50	...	Disston	44
6	.50	...	Disston	3
B	.50	...	Simonds Style B	....
D	.55	...	Simonds Style D	....
F	.50	...	Simonds Style F	....

Wide Band Saws
For Wood



Width In.	Usual Gauge	Approx. Wt., Lbs. per Ft.	Price per Foot	Width In.	Usual Gauge	Approx. Wt., Lbs. per Ft.	Price per Foot
2	18 to 20	.28	$1.00	11	14 to 16	3.09	$5.40
3	18 to 20	.42	1.40	12	13 to 15	3.37	6.00
3½	18 to 20	.50	1.60	13	13 to 15	3.65	7.20
4	17 to 19	.57	2.00	14	13 to 15	4.50	8.40
4½	17 to 19	.64	2.20	15	12 to 14	4.82	10.20
5	17 to 19	.83	2.40	16	12 to 14	5.92	12.00
6	17 to 19	1.06	3.00	17	12 to 14	6.29	16.80
7	16 to 18	1.37	3.40	18	12 to 14	6.66	21.60
8	14 to 18	1.76	3.80	..	....	....	.....
9	14 to 18	2.20	4.30	..	....	....	.....
10	14 to 16	2.81	4.80	..	....	....	.....

Saws of odd widths not listed, take the price of the next wider size.

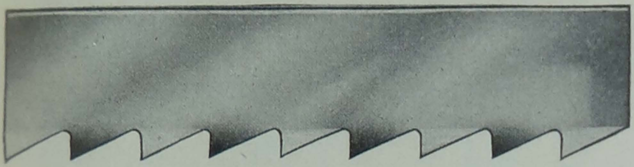
For saws of heavier gauge than listed, add 5 per cent to list for each gauge heavier.

No extra charge for saws one to two gauges thinner than list; when more than two gauges thinner, add 5 per cent to list for each gauge.

Double edge band saws—list price per foot—all widths, advance 10 per cent over list prices of single edge saws as above. Toothed blanks, same price as finished saws. Band saw blanks, ground and polished, any width, furnished.

Milford Narrow Band Saws

For Cutting Wood



Furnished either in coils or cut to length and welded.

There is always one more point per inch than there are teeth per inch.

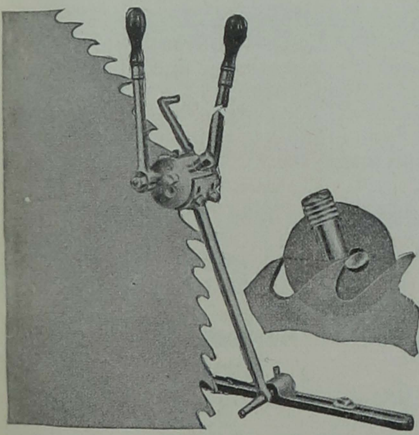
Blades cut to length, measuring 6 inches or more over the even foot will be charged for the entire foot; less than 6 inches over the even foot will not be charged for.

If not set of filed, 4 cents per foot less.

Width Inches	Per Foot	Welding or Brazing	Thickness Inches	Gauge	Teeth per Inch
3/16	**$.13**	**$.50**	.022	24	6
3/16	**.13**	**.50**	.032	21	4–6
1/4	**.13**	**.50**	.022	24	6
1/4	**.13**	**.50**	.032	21	4–5–6
3/8	**.14**	**.50**	.025	23	4–5–6
3/8	**.14**	**.50**	.032	21	3–4–5–6
1/2	**.15**	**.50**	.025	23	4–5
1/2	**.15**	**.50**	.032	21	2–3–4–5
5/8	**.16**	**.60**	.032	21	3–4
5/8	**.16**	**.60**	.035	20	2–4
3/4	**.18**	**.60**	.032	21	2–3–4–5
3/4	**.18**	**.60**	.035	20	2–3
1	**.22**	**.70**	.035	20	3–4
1 1/4	**.26**	**.70**	.035	20	2–3
1 1/2	**.32**	**.80**	.035	20	2–3
1 3/4	**.38**	**.80**	.035	20	2

No. 0 Disston Eccentric Swages

For Circular Saws



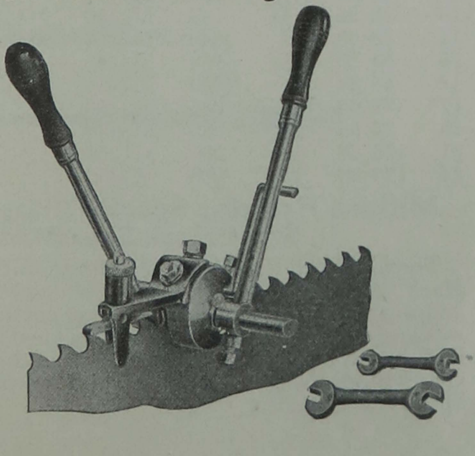
The No. 0 Disston Eccentric swage is adapted for circular saws from 6 to 12 gauge thickness.

A sketch of the teeth should be sent when ordering these swages.

Prices upon application.

Disston Eccentric Swages

For Band Saws

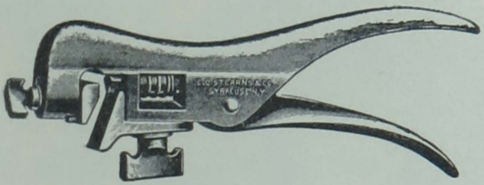


Made in three sizes. No. 1 for saws 12 to 16 gauge; No. 2, 16 to 19 gauge; No. 3, 20 gauge and lighter. By use of extra brackets can be used for cylinder and circular saws. When ordering, state thickness of saws and send sketch of teeth.

Prices on application.

Stearns Cross Cut Saw Sets

Morrill Pattern



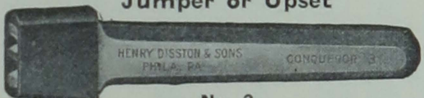
Designed for cross cut and circular saws from 14 to 20 gauge. Anvil and plunger are hardened; tempered steel spring. Polished finish. Length over all, 9½ inches.

Packed 6 in a box. Weight per dozen, 21 pounds.

No. **203**, With Pointed Plunger for Cross Cut and Circular Saws, Single Tooth............per dozen	**$18.00**
No. **204**, With Square Plunger for "M" Champion or Other Double Tooth Cross Cut Saws....per dozen	**18.00**

Disston Conqueror Swages

Jumper or Upset

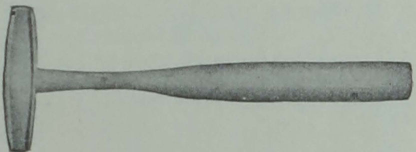


No. 3

Packed one in box.

No.	Each	Used On	Lgth.In.	Wt.,Oz.
00	**$7.00**	Circular Saws, 5 to 9 Gage........	7	26
0	**6.00**	Circular Saws, 5 to 9 Gage........	6	23
1	**5.50**	Circular Saws, 6 to 9 Gage........	5	19
2	**4.50**	Small Circular and Mill Saws, Not Heavier than 10 Gage..........	3¾	8
2½	**4.00**	Circular, Gang and Band Saws with Moderately Small Teeth, Not Heavier than 13 Gage..........	3	5
3	**3.50**	Small Circular and Band Resaws, Not Heavier than 15 Gage.......	2 3/16	3
4	**4.50**	Band Saws, 13 to 16 Gage.........	4⅜	9

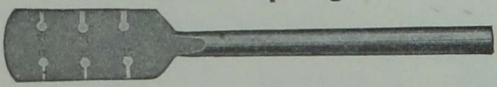
Disston Swage Bar Hammers



Price .... each **$2.05**

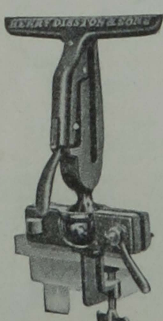
Disston Spring Saw Sets

For Band, Shingle or Veneer Saws



No.	Kind of Handle	Lgth. Over All, In.	Slots Gauge	Price Each
2	Iron	8	12 to 17	**$3.20**
1	Wood	7	12 " 17	**3.20**
3	Wood	15	5 " 12	**5.80**

Saw Clamps



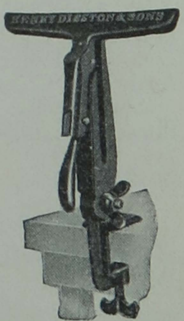
No. 1 Adjustable

Lever adjustment permits the clamp to be placed at any angle.

No. 1 has 9-inch jaw and ball and socket adjustment. Weight each, 8¾ pounds.

No. 2 has 9½-inch jaw and swivel adjustment. Weight each, 5¼ pounds.

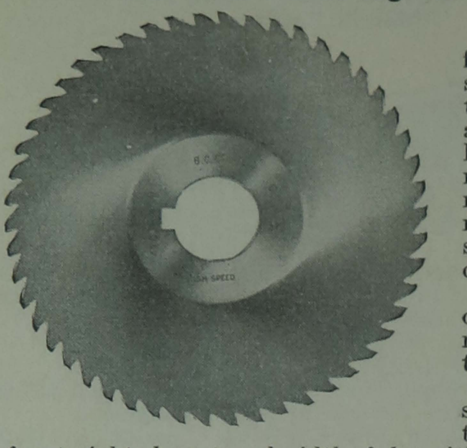
Japanned.



No. 2 Improved

No. **1**, Adjustable.........................per dozen	**$64.00**
No. **2**, Improved..........................per dozen	**44.30**

Metal Slitting Saws



Rake Teeth

Recommended for all ordinary slotting and cutting off of steel, and cast or malleable iron; and may be used on many non-ferrous metals where the slots are not too deep.

Hollow ground on the sides, the relief starting at the cutting edge.

When ordering special saws state type desired, kind of material to be cut, and width of slot with allowable limits.

No.	High Speed Steel Each	Diam. Saw In.	Width Face In.	Size Hole In.	No.	High Speed Steel Each	Diam. Saw In.	Width Face In.	Size Hole In.
G 1	$2.80	2½	1/32	⅞	G20	$5.80	5	1/16	1
G 2	2.80	2½	3/64	⅞	G21	6.30	5	3/32	1
G 3	2.80	2½	1/16	⅞	G22	6.60	5	⅛	1
G 4	2.80	2½	3/32	⅞	G23	6.60	5	⅛	1¼
G 5	2.90	2½	⅛	⅞	G25	7.00	5	5/32	1
G 7	3.30	3	1/32	1	G26	7.40	5	3/16	1
G 8	3.30	3	3/64	1	G28	7.30	6	1/16	1
G 9	3.40	3	1/16	1	G29	8.40	6	3/32	1
G10	3.40	3	3/32	1	G30	8.60	6	⅛	1
G11	3.50	3	⅛	1	G31	10.40	6	3/16	1
G12	3.70	3	5/32	1	G31A	8.60	6	⅛	1¼
G13	4.30	4	1/32	1	G32A	10.40	6	3/16	1¼
G14	4.40	4	3/64	1	G37	17.50	8	⅛	1
G15	4.50	4	1/16	1	G38	17.50	8	⅛	1¼
G16	4.70	4	3/32	1	G39	19.80	8	3/16	1¼
G17	5.00	4	⅛	1	....	.....	.	..	....
G18	5.20	4	5/32	1	....	.....	.	..	.....
G19	5.50	4	3/16	1	....	.....	.	..	.....

Milford Hack Saw Blades

Proper Blades to Use for Individual Purposes

Hand Blades

Materials	Teeth per Inch Recommended
Machinery Steel, ¼ Inch Thickness and Less....	24
" " ¼ " up to 1 Inch..........	18
" " 1 " and More...........	14
High Carbon and High Speed Steel, ¼ Inch and Less....................................	24
High Carbon and High Speed Steel, over ¼ Inch.	18
Drill Rods, No. 30 and Smaller................	32
" " " 30 to ¼ Inch..................	24
" " " over ¼ "	18
Solid Brass, Bronze and Aluminum.............	14
Pipe and Light Angle Iron....................	24 Mil. Flex.
Light Tubing and Light Sheet Metal...........	32 Mil. Flex.
Conduit Pipe, General Use....................	24 Mil. Flex.
" " Spiral BX Conduit Cable..........	32 Mil. Flex.
Cast Iron, Depending on Size and Shape	14 to 18
General Use..................................	18

Light Power Blades

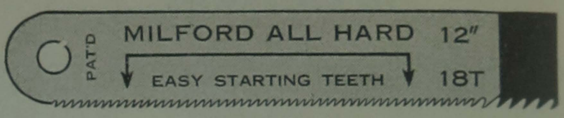
Materials	Teeth per Inch Recommended
Machinery and Tool Steel, over 1 Inch and for General Use....................................	14
Angle Iron, Channels, Heavy Tubing and Bars Less than 1 Inch.................................	14
Pipe, Light Angles and Drill Rods.............	14

Heavy Power Blades

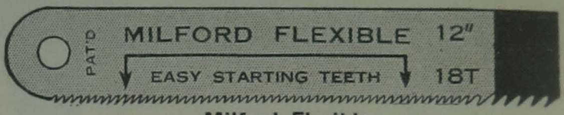
Materials	Speed Strokes per Minute	Teeth per Inch Recommended 18 Gauge or .049	16 Gauge or .065
Machinery Steel, Large Sections.....	90–125	10	10
" " 1 Inch and Larger..	90–125	10	10
" " Less than 1 Inch...	90–125	14	10
High Carbon and High Speed Steel, 1 Inch and Larger................	50– 90	14	10
High Carbon and High Speed Steel, Less than 1 Inch................	50– 90	14	10
Light Angle Iron, Pipe, Channels.....	90–125	14	10

Milford Duplex Hack Saw Blades

Tungsten Alloy Steel



Milford All Hard



Milford Flexible

The Milford Duplex Hack Saw Blade is the Modernized Blade with easy starting fine pitch teeth on the forward end of the blade. It has met the approval of thousands of mechanics because of these important features:

1. Starts cut at any angle.
2. Teeth will not catch in corners.
3. No scraping to begin cut.
4. Reduce cutting time.
5. Will not slip off cutting line.
6. Distributes wear full length of blade.

All Milford Blades are now packaged in a new Cellophane Window Package which makes it convenient for the user to tell at a glance the identity of the blade, the length and the number of teeth and the number of blades in the package. Milford Blades are the only Hack Saw Blades stamped with the type, length and number of teeth.

Milford All Hard

Lgth. In.	Per Gross	Width Inches	Thick. In.	Teeth per Inch 14-28	18-36	24-36	Wt. Lbs. per Gross
8	$8.00	7/16	.025	....	MD 818	MD 824	3¾
10	10.00	½	.025	MD1014	MD1018	MD1024	4½
12	12.00	½	.025	MD1214	MD1218	MD1224	5¾
12	13.50	9/16	.025	MD2614	MD2618	MD2624	6¾

Milford Flexible

Lgth. In.	Per Gross	Width Inches	Thick. In.	Teeth per Inch 14-28	18-36	24-36	Wt. Lbs. per Gross
8	$8.00	7/16	.025	....	FD 818	FD 824	3¾
10	10.00	½	.025	FD1014	FD1018	FD1024	4½
12	12.00	½	.025	FD1214	FD1218	FD1224	5¾
12	13.50	9/16	.025	FD2614	FD2618	FD2624	6¾

All the above blades can be had in Wavy-Set and are recommended for electricians in the cutting of conduit.

Safety Duplex Blades

Tungsten Alloy Steel—Unbreakable

Milford Safety Blades are unbreakable and will not buckle under pressure or fly in pieces if caught in the work. They are practically as hard as an all hard blade, yet are so flexible that they can be bent from pinhole to pinhole without breaking. Made only in hand frame sizes with Duplex Easy Starting Teeth.

Lgth. In.	Per Gross	Width Inches	Thick. In.	Duplex Teeth per Inch and Stock Number 14-28	18-36	24-36	32
8	$12.00	7–16	.025	....	STD 818	STD 824	STD 832
10	15.00	1–2	.025	STD1014	STD1018	STD1024	STD1032
12	18.00	1–2	.025	STD1214	STD1218	STD1224	STD1232

Power Sizes

Tungsten All Hard Blade

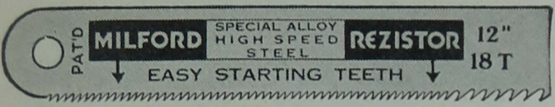
Lgth. In.	Per Gross	Width In.	Thick. In.	Teeth per Inch 10	14	18	Wt., Lbs. per Gross
12	$16.20	⅝	.032	......	M2824	M2828	9½
12	19.44	¾	.032	......	M2424	M2428	11
12	24.48	¾	.049	M2490	M2494	......	17½
12	32.64	1	.049	M2190	M2194	......	23
14	22.68	¾	.032	......	M4424	......	12½
14	28.56	¾	.049	M4490	M4494	......	20¼
14	38.08	1	.049	M4190	M4194	......	27
14	58.80	1¼	.065	M4450	......	......	46
17	46.24	1	.049	M7190	M7194	......	33
17	71.40	1¼	.065	M7450	......	......	54
18	75.60	1¼	.065	M8450	......	......	59
21	105.84	1½	.065	M1250	......	......	82½
24	120.96	1½	.065	M4250	......	......	95

Milford Rezistor Special Alloy High Speed Steel Hack Saw Blades

The high speed cutting and endurance of Milford Rezistor Hack Saw Blades are the result of combining several heat and wear resisting elements. Speed of cutting and remarkable wearing qualities make these blades ideal for cutting nickel, high speed, manganese steel, welded pipe, etc. Milford Rezistor Blades cost from 30% to 40% less than ordinary High Speed Steel Blades.

Milford Rezistor Special Alloy High Speed Steel Hack Saw Blades

Duplex Hand Frame Sizes



Packed ½ gross in a box.

Lgth. In.	Width In.	Thick. In.	No. of Blade Teeth per Inch 14-28	18-36	24-36	32-36	Wt. Lbs. per Gross	Per Gross
10	½	.025	....	RD1018	RD1024	RD1032	5	$40.00
12	½	.025	RD1214	RD1218	RD1224	RD1232	6½	48.00
10	⅝	.032	....	RD0828	....	....	7¾	67.50
12	⅝	.032	....	RD2828	....	....	9¾	81.00

Power Machine Sizes

Packed 1 dozen in a box.

Lgth. In.	Width In.	Thick. In.	No. of Blade Teeth per Inch 4	6	10	14	Wt. Lbs. per Dozen	Per Dozen
12	1	.049	......	......	......	R1214	2⅛	$10.08
12	1	.065	......	R1206	R1210	......	2¾	10.08
14	1	.049	......	......	......	R1414	2¼	11.76
14	1	.065	......	R1406	R1410	......	3 1/16	11.76
14	1¼	.065	R1444	R1446	R1440	......	3⅞	14.70
17	1	.049	......	......	......	R1714	3	14.28
17	1	.065	......	R1706	R1710	......	3½	14.28
17	1¼	.065	R1744	R1746	R1740	......	4¾	17.85
18	1	.065	......	......	R1810	......	4⅛	15.12
18	1¼	.065	R1844	R1846	R1840	......	5	18.90
21	1½	.065	R2154	R2156	R2150	......	6 15/16	26.46
24	1½	.065	......	R2456	R2450	......	8 7/16	30.24
				Extra Heavy				
18	1½	.072	R1824	R1826	......	......	6½	$24.84
21	2	.072	R2124	R2126	......	......	11⅝	38.64
24	2	.072	R2424	R2426	......	......	12 3/16	44.16

No. F632 Milford Midget Hack Saw Blades

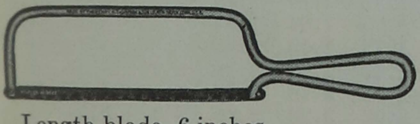
MILFORD-MIDGET
MADE IN U.S.A.

Fits Milford Midget Hack Saw Frame. It is .014 inch thick, ¼ inch wide and 6 inches in length. Made with 32 teeth to the inch.

Weight per gross, 14 ounces.

Per Gross.. **$9.00**

No. 5 Milford Midget Hack Saw Frames



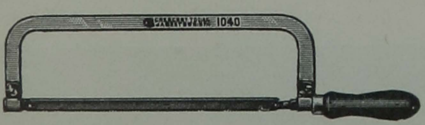
Made from round spring wire, ¼-inch diameter, nickel-plated. 1⅞ inches deep at handle.

Length blade, 6 inches.

Packed 1 dozen to a box. Weight 3 pounds.

No. 5, Including Blade....................per dozen **$4.20**

No. 1040 Crescent Hack Saw Frames



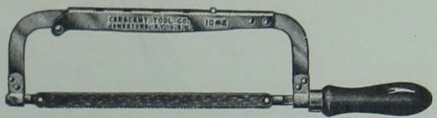
This is a heavy gauge steel frame made in the solid frame style. The blade is tightened by turning the handle.

Nickel-plated frame with handle finished in Crescent blue enamel. Handle turned from selected hard wood.

Packed 1 in a box, with blade; 8-inch size packed 4 dozen in a shipping carton. Other sizes 3 dozen in a carton.

Size................inches	8	10	12
No. **1040**..............each	**$.60**	**.65**	**.75**
Depth of Cut.........inches	2¼	3¼	3½
Gauge Steel................	.164x9/16	3/16x11/16	3/16x11/16
Weight.............ounces	10	14	15

No. 1042 Crescent Hack Saw Frames

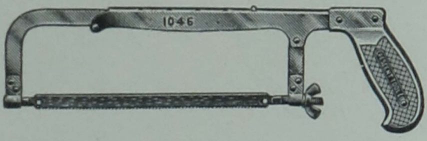


This saw is adjustable 8 to 12 inches. Made round edge steel. Has nickel-plated frame, hardwood handle.

1 in box, 6 dozen in case. Wt., per dozen, 13 lbs.

No. **1042**..each **$.75**

No. 1046 Crescent Hack Saw Frames



This is an all steel frame, adjustable style. The handle is made of heavy gauge steel in the popular pistol grip style and is securely riveted to the frame. It will stand throwing around without breaking.

Nickel-plated frame and handle.

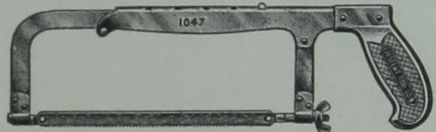
Frame is adjustable for 8, 10 and 12-inch blades. Depth of cut, 2½ inches; steel, .164x9/16.

Packed 1 in a box, with display easel in cover; 3 dozen in a shipping carton.

Weight each, 19 ounces.

Price, No. **1046**...................................each **$1.00**

No. 1047 Crescent Hack Saw Frames



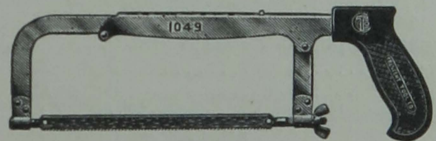
All steel frame, adjustable style. Handle is made of heavy gauge steel in the popular pistol grip style and is securely riveted to the frame. This saw will stand throwing around without breaking.

Both frame and handle are nickel-plated.

Packed 1 in a box with blade. Box has display easel in cover. Packed 3 dozen in a shipping carton.

No.	Size Adjustable Inches	Depth Cut Inches	Steel	Weight Ounces Each	Price Each
1047	8-12	3¼	3/16x11/16	23	**$1.25**

No. 1049 Crescent Hack Saw Frames



This is a frame of the adjustable style with a pistol grip handle made of a tough composition. The frame extends all the way through the handle, and handle will not break off.

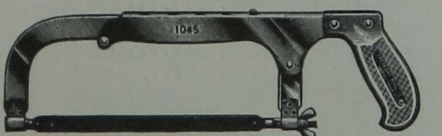
Nickel-plated frame and black composition handle.

Packed 1 in a display box with blade; 3 dozen in a shipping carton.

No.	Size Adjustable Inches	Depth Cut Inches	Steel	Weight Ounces Each	Price Each
1049	8-12	3¼	3/16x11/16	23	**$1.25**

No. 1045 Crescent Hack Saw Frames

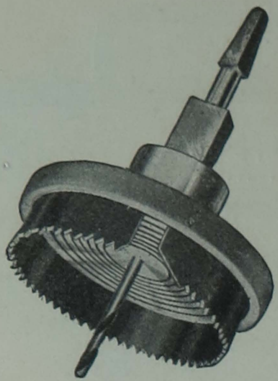
Extra Heavy Duty



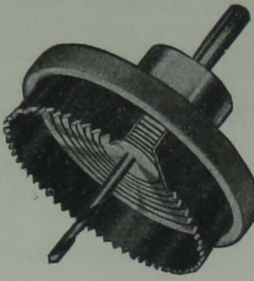
All steel, nickel plated. Adjustable for blades from 8 to 12 inches long. Steel used is 3/16x⅞ in. Packed one in a box.

No. **1045**...each **$2.00**

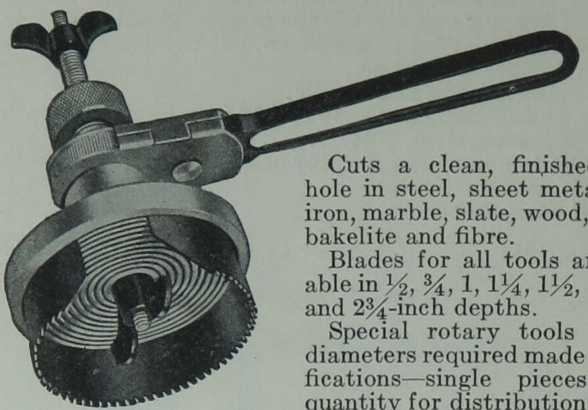
Misener Rotary Hack Saws



Type B



Type P



Type R

Cuts a clean, finished round hole in steel, sheet metals, cast iron, marble, slate, wood, plaster, bakelite and fibre.

Blades for all tools are available in ½, ¾, 1, 1¼, 1½, 1¾, 2¼, and 2¾-inch depths.

Special rotary tools for any diameters required made to specifications—single pieces or in quantity for distribution.

No. 1

Cuts 11 actual diameters from 1 to 3½ inches by ¼-inch variations.

Weight each, 2¾ pounds Types B and P, 4½ pounds Type R.

Type	B	P	R
With Set ¾-Inch Blades........each	$12.00	12.00	12.50

No. 2

Cuts 9 outside diameters of iron pipe or conduit from ¾ to 4 inches. The openings made are just right to allow the pipe to slip through.

Weight each, 3¾ pounds Types B and P; 5½ pounds Type R.

Type	B	P	R
With Set ½-Inch Blades........each	$13.50	13.50	14.50

Nos. 3 and 3X

No. 3 cuts 6 actual diameters from ¾ to 2 inches by ¼-inch variations; No. 3X cuts 7 actual diameters from ¾ to 2¼ inches by ¼-inch variations.

Weight each, 1 pound Types B and P.

No	3	3	3X	3X
Type	B	P	B	P
With Set ½-Inch Blades......each	$7.00	7.00	8.00	8.00

No. 4

Cuts 6 outside diameters of iron pipe or conduit from ½ to 2 inches.

Weight each, 1 pound Types B and P.

Type	B	P
With Set ½-Inch Blades.................each	$7.00	7.00

No. 7

Cuts 11 actual diameters from 2 to 7 inches by ½-inch variations.

Weight each, 8¼ pounds Types B and P; 9¾ pounds, Type R.

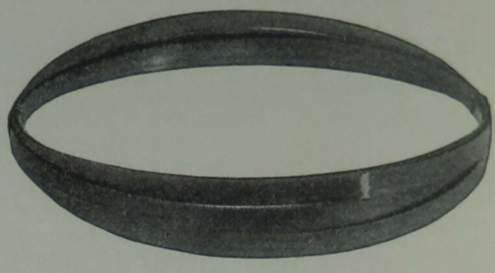
Type	B	P	R
With Set 1-Inch Blades.........each	$18.00	18.00	19.50

Extra Parts

Bit Brace Shank for Nos. 1, 2 and 7.............each	$1.50
Round Straight Power Shank for Nos. 1, 2 and 7 ....each	1.75
Morse Taper Power Shank for Nos. 1, 2 and 7.....each	1.75
Ratchet Handle Attachment for Nos. 1, 2 and 7.each	3.00
Bit Brace Shank for Nos. 3 and 4................each	.75
Round Straight Power Shank for Nos. 3 and 4.....each	.75
Morse Taper Power Shank for Nos. 3 and 4.......each	1.00

Milford Metal Cutting Band Saws

Hard Teeth—Flexible Back



Furnished either in coils or cut to length and welded.

State when ordering: (1) width; (2) gauge; (3) teeth per inch; (4) type and shape of material to be cut; (5) temper of blade desired.

Welded saws measuring 6 inches or more over the even foot will be charged for the entire foot; less than 6 inches over the even foot will not be charged for. Example: 1 saw, ½ inch wide x 15 feet 8 inches long equals 16 feet at 11 cents, $1.76, brazing 40 cents, total $2.16.

Width In.	Thickness In.	Thickness Ga.	Teeth per Inch	Per Foot	Welding Each
¼	.014	28	32	$.12	$.40
3/16	.025	23	14, 18, 24, 32	.08	.40
¼	.025	23	14, 18, 22, 32	.09	.40
⅜	.025	23	10, 12, 14, 18, 24, 32	.10	.40
½	.025	23	10, 12, 14, 18, 24, 32	.11	.40
⅝	.031	21	8, 10, 12, 14, 18, 24, 32	.14	.50
¾	.031	21	6, 8, 10, 12, 14, 18, 24	.16	.50
1	.036	20	6, 8, 10, 12, 14, 18, 24	.20	.50

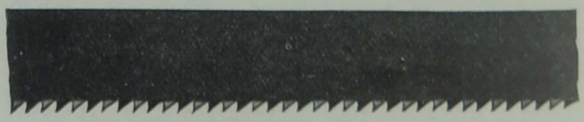
3/16-In. Wide Jig Saw Coils, 50 Ft. Long......per coil	$4.00
¼-In. Wide Jig Saw Coils, 50 Ft. Long......per coil	4.50
⅜-In. Wide Jig Saw Coils, 50 Ft. Long......per coil	5.00
Magazine Saw Coils, ⅝ In. Wide, .031 In. Thick and 25 Ft. Long.........................per coil	3.50

Milford Metal Cutting Band Saw Blades

Hard Teeth, Flexible Back, Cut to Length and Brazed

Lengths Feet Inclusive	Width, Inches and Gauge						
	3/16 x.025	¼ x.025	⅜ x.025	½ x.025	⅝ x.031	¾ x.031	1 x.036
5½ to 6 5/12	$.88	$.94	$1.00	$1.06	$1.34	$1.46	$1.70
6½ to 7 5/12	.96	1.03	1.10	1.17	1.48	1.62	1.90
7½ to 8 5/12	1.04	1.12	1.20	1.28	1.62	1.78	2.10
8½ to 9 5/12	1.12	1.21	1.30	1.39	1.76	1.94	2.30
9½ to 10 5/12	1.20	1.30	1.40	1.50	1.90	2.10	2.50
10½ to 11 5/12	1.28	1.39	1.50	1.61	2.04	2.26	2.70
11½ to 12 5/12	1.36	1.48	1.60	1.72	2.18	2.42	2.90
12½ to 13 5/12	1.44	1.57	1.70	1.83	2.32	2.58	3.10
13½ to 14 5/12	1.52	1.66	1.80	1.94	2.46	2.74	3.30
14½ to 15 5/12	1.60	1.75	1.90	2.05	2.60	2 90	3.50
15½ to 16 5/12	1.68	1.84	2.00	2.16	2.74	3.06	3.70
16½ to 17 5/12	1.76	1.93	2.10	2.27	2.88	3.22	3.90
17½ to 18 5/12	1.84	2.02	2.20	2.38	3.02	3.38	4.10
18½ to 19 5/12	1.92	2.11	2.30	2.49	3.16	3.54	4.30
19½ to 20 5/12	2.00	2.20	2.40	2.60	3.30	3.70	4.50
20½ to 21 5/12	2.08	2.29	2.50	2.71	3.44	3.86	4.70

Milford Band Saws for Dry Ice



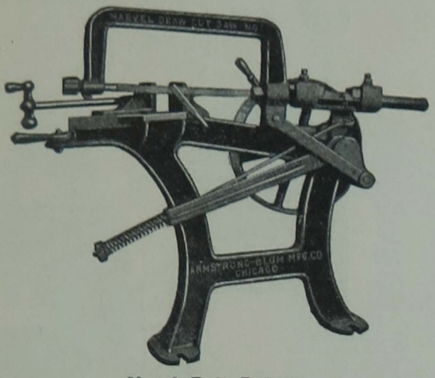
A very tough saw, teeth designed and set for cutting dry ice at fast speed.

This blade has hard teeth, flexible back, and can be supplied in any length desired.

Width.........................in.	½	⅝	¾	1
Per Foot..........................	$.11	.14	.12	.20

Marvel Draw Cut Hack Saws

No. 1—4x4 Inches



No. 1 Belt-Driven

Feed pressure is applied to saw blade on draw cut only, pressure being released on return stroke. Feed is regulated by hand nut at front end of compression spring. Feed lever raises or lowers saw frame and holds it at any angle.

Vise is quick action type. Jaws are of liberal dimensions. Extension to table so material rests on both sides of saw.

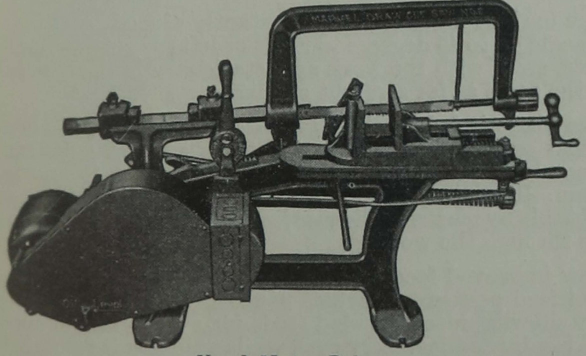
Drive shaft runs in an unusually long bronze bearing. Automatically stops when a cut is completed.

Capacity, 4x4 inches. Length of blade, 12 inches. Size of pulley, 18x2¼ inches. Revolutions, 60 to 90 per minute. Takes 2-inch belt.

Motor-driven No. 1 Saw uses ¼-h.p. motor, connected to crank shaft by means of chains and sprockets running in oil in gear case.

Description	Each	Ship. Wt., Lbs.
Belt-Driven	**$42.00**	140
Motor-Driven Complete, Including Motor:		
A.C. 110–220-Volt, 60-Cycle, Single-Phase	**90.00**	225
A.C. 110–220-Volt, 25-Cycle, Single-Phase	**97.00**	235
D.C. 115–230-Volt	**94.00**	225
A.C. 220-Volt, 60 Cycle, 2 or 3-Phase	**93.00**	225
A.C. 220-Volt, 25 Cycle, 3-Phase	**98.00**	235

No. 2—8x8 Inches



No. 2 Motor-Driven

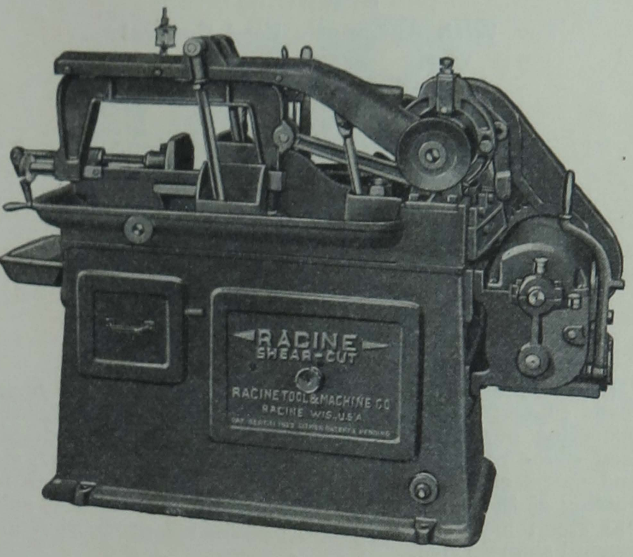
Similar to No. 1, but much heavier throughout. Has loose, swivel vise so that material can be cut at an angle up to 45°. Entire vise can be removed, leaving a T-slotted table for holding jigs, irregular shapes, etc. Has adjustable stroke, longest stroke 6¾ inches, shortest stroke 4 inches.

Capacity, 6x6 inches on long stroke, 8x8 inches on short stroke. Takes any length blade from 12 to 17 inches. Revolutions, 50 to 70 per minute. Size of pulley (belt-driven machine), 20x2¾ inches. Takes 2½-inch belt.

Motor-driven machine uses ½-h.p. motor connected to crank shaft by means of silent chain, machined sprockets, and intermediate cut gears all running in oil in gear case.

Description	Each	Ship. Wt., Lbs.
Belt-Driven	**$72.00**	300
Motor-Driven Complete, Including Motor:		
A.C. 110–220-Volt, 60-Cycle, Single-Phase	**185.00**	450
A.C. 110–220-Volt, 25-Cycle, Single-Phase	**192.00**	450
D.C. 115–230-Volt	**187.00**	450
A.C. 220, 440, 550-Volt, 60-Cycle, 2 or 3-Phase	**187.00**	460
A.C. 220, 440, 550-Volt, 25-Cycle, 3 Phase	**192.00**	460

Racine Shear-Cut Saws



Construction.—The machine is of the box frame type construction. Mechanical lifting device lifts the blade to clear stock on forward stroke by means of a cam on the main shaft and a roller carrier having 2 hardened rollers.

Feed.—Machine has a progressive screw feed regulated by a lever adjustable to correspond with a graduated scale. This permits of 25 variations from 1/1000 to 21/1000 inch per stroke by setting lever at desired feed. Feed screw is 1 inch in diameter and operated through a split bronze nut in a cast iron housing. Screw is mounted on ball thrust bearings. Movable vise jaw is held in place by a keyway machined in bottom side of table. Vise table is provided with steel plate set in table top and is removable for replacement.

Saw Guide.—Four bearings each 1 inch wide by 10 inches long. It is fitted with 2 steel gibs with simple screw adjustment for wear. The saw guide bearings are lubricated by means of a felt pad; all other main bearings are lubricated by wick oilers. Saw guide is provided with counter balances which hold the saw frame at any desired height.

Crankshaft.—One piece turned and ground. Connecting rod is bronze bushed with provision for take-up.

Clutch.—A cast iron expanding ring clutch of ample capacity is provided; clutch is connected to the starting lever, which lever also connects with the split nut on the feed screw, thus, by one movement, lever starts both the reciprocating action and the feed.

Knockout.—An automatic knockout device is provided which throws out the clutch and stops the saw at end of cut.

Capacities.—Standard machines are 6x6 inches capacity with actual capacity of 6⅝x6⅝ inches. Special capacity of 7½x7½ and 8¼x9¾ inches are also available. For angle cutting work a special machine can be furnished with a maximum capacity of 3 inches at 45 degrees.

Motor drive has 2-h.p. motor with speed of 1750 r.p.m. Height of table is 24½ inches.

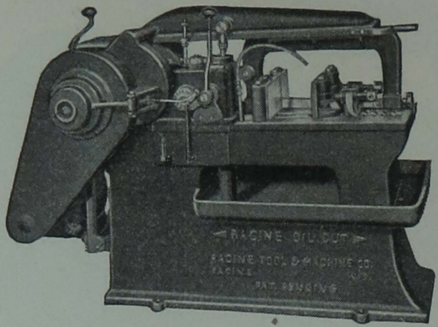
Specifications

Machine	Floor Space Inches	Overall Height Inches	S.P.M.	Blade Inches	Stroke Inches	Weight Pounds
Belt Driven						
20	30x56	39	135	14	6	1170
20-A	30x56	39	60–90–135	14	6	1320
Motor Driven						
20-B	30x56	39	135	14	6	1330
20-C	30x56	39	60–90–135	14	6	1420
Under Belt Driven						
22	58½x26½	39	135	18	6	1295
22-A	58½x26½	39	60–90–135	18	6	1445
Under Motor Driven						
22-B	58½x26½	39	135	18	6	1455
22-C	58½x26½	39	60–90–135	18	6	1475

Prices upon application.

Racine Oil-Cut Hydraulic Metal Cutting Machines

With Automatic Feed Control



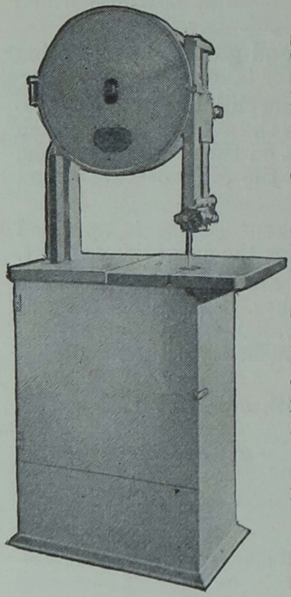
Some important features of this machine are: Single lever control of feed, clutch, rapid traverse and neutral operating positions; self-compensating, flexible hydraulic feed which regulates itself automatically to the kind, size and shape of work; simple yet sensitive adjustments for cutting of the thinnest walled tubing to the hardest solid bar steel; high speed cutting ability for production and general shop service.

Capacity	inches	**6** Sq., **6⅝** Rd.
Capacity when Cutting at 45°	inches	4
Blades, 16 Gage, 4 or 6 Tooth	inches	14x1¼
Stroke	inches	5
Drive Pulley	r.p.m.	420
Cutting Speeds		3
Motor, 1½ H.P.	r.p.m.	1200
Floor Space, Motor Drive	inches	24x52
Floor Space, Belt Drive	inches	24x43
Height over All, Saw Guide Raised	inches	44
Height over All, Saw Guide Down	inches	36
Height from Floor to Top of Table	inches	22
Shipping Weight, Motor Drive	pounds	1000
Shipping Weight, Belt Drive	pounds	900

Prices and further information upon application.

Jones Superior 20-Inch Band Saws

For Dry Ice



This machine has many features seldom found on this size band saw. The wheels made from steel discs have been dynamically balanced which eliminates vibration.

The wheels are completely guarded both front and rear.

There is an extreme distance of 14 inches under the guide when raised, giving the machine a capacity equal to 30 or 32-inch band saws. The upper wheel is mounted on Timken Roller Bearings and the lower wheel is mounted directly on the shaft of a ball bearing motor, or the machine may be arranged for belt drive.

May be furnished with various motors from ½ to 2 h.p.

May also be furnished with a roller table for cutting Dry-Ice or metal.

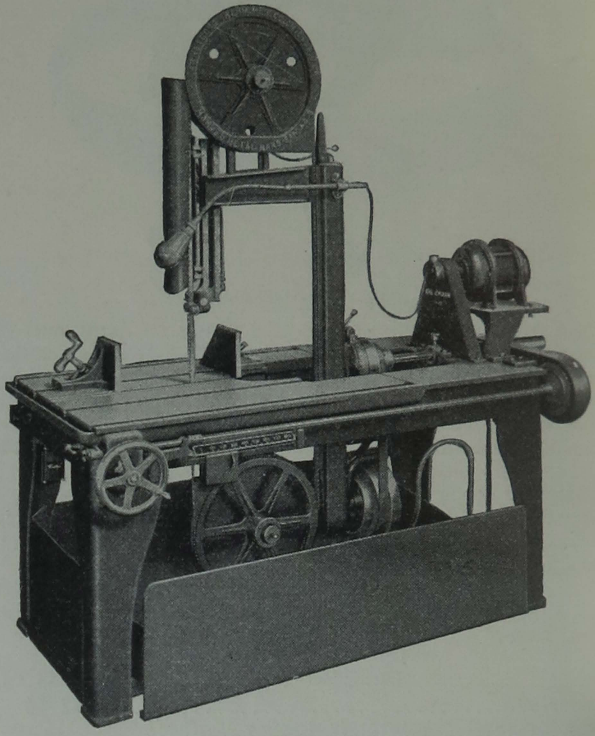
Size Wheel	inches	20
Height Under Guide When Raised	inches	14
Size Table	inches	18x22
Speed	r.p.m.	900
Length Saw Blade	feet	11⅓
Widest Blade That Can Be Used	inches	1
Height Overall	inches	75
Height of Table from Floor	inches	39
Floor Space Required	inches	22x34
Shipping Weight	pounds	550

Prices upon application.

No. 8 Marvel Metal Band Saws

Capacity 18x18 Inches

Belt or Motor-Driven



A universal metal cutting band saw that will handle almost any conceivable sawing problem. It will handle the smallest and most delicate work with ease and accuracy, as well as large bulky bars or sections up to its full capacity of 18x18 inches.

The upright column can be instantly tipped or tilted to any angle up to 45 degrees to right or left for cutting angles, mitres, etc., with the work held stationary in the vise jaws just the same as for straight cutting.

The blade is fed straight forward into the work, always vertical or perpendicular to the table so that any length bar can be cut in two without interfering with the upright column. The work does not move, being clamped to the rigid table by means of the vise jaws, and the blade moves or feeds through the work.

New improved feeding mechanism applies any predetermined feed pressure in actual pounds. Equipped with feed chart showing recommended feeds for every class of work. Feed is adjusted instantly even while machine is running by simply sliding feed indicator along the graduated feed scale. Handwheel provides hand feed and perfect control.

Three-step cone pulleys provide three blade speeds. Automatic stop. Plunger type lubricant pump and pans are regularly furnished. Quick action chuck jaws can be removed for jig work. All important bearings—band wheels, carriage and blade guides—are equipped with precision ball bearings.

Capacity of throat: Depth, 18 inches; height, 20 inches. Feed or travel of carriage and blade, 18 inches. Uses saw blades 14 feet 8 inches long, ¾ inch wide and .032 inch thick. Diameter of band wheels, 18 inches.

Diameter of tight and loose pulleys (belt-driven machine). 10 inches; speed, 400 r. p m.; take 2-inch belt.

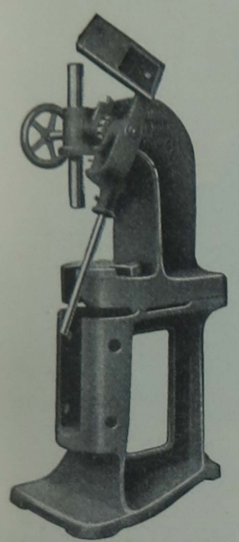
Motor-driven machine direct connected by silent chain.

Floor space, 36 inches by 6½ feet. Height over all, 7 feet.

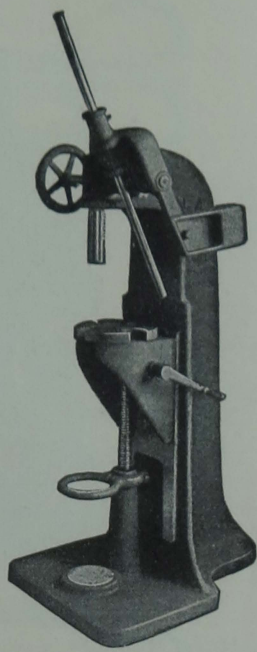
Shipping weight: Belt-driven, 2125 pounds; motor-driven, 2280 pounds.

Prices and further information upon application.

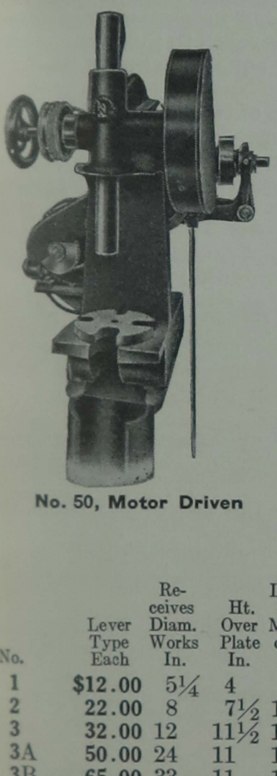
Greenerd Arbor Presses



No. 3½ with Stand



No. 4



No. 50, Motor Driven

Greenerd Arbor Presses may be used for broaching, punching, bending, straightening bars, pressing in pins and bushings, etc.

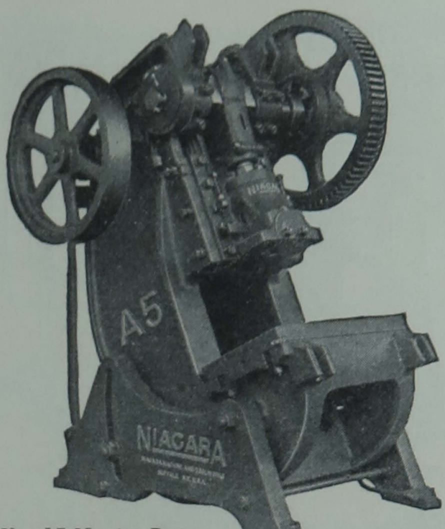
Listed are a few of the 65 styles of Greenerd Arbor Presses. Nos. 1, 2, 3, 3A, 3B, 3JBS, 3½, 3¾, and 40 are bench type and may be had with stand at extra charge. Nos. 4, 4F, 5, and 7 are C clamp floor type machines with adjustable knees.

The No. 50 press is a motor driven 3-ton pressure arbor press, used for assembly work, small broaching, keyway cutting, etc.

Full information about the new hydraulic presses, 15 and 30 tons pressure, and complete catalog on Greenerd Arbor Presses will be furnished upon request.

No.	Lever Type Each	Receives Diam. Works In.	Ht. Over Plate In.	Largest Mandrel In.	Movement Rack or Ram In.	Pressure Tons	Lgth. and Diam. Rack or Ram In.	Total Ht. In.	Net Wt. Lbs.
1	$12.00	5¼	4	⅞	4⅝	500 lbs.	7x ⅞	9	17
2	22.00	8	7½	1	8	2	12x1 3/16	16	62
3	32.00	12	11½	1½	11½	3	17x1¾	21½	140
3A	50.00	24	11	1½	11	3	17x1¾	24	250
3B	65.00	33	11	1½	11	3	17x1¾	27	340
3JBS	52.00	12	16	1½	14	3½	25x1¾	28½	215
3½	70.00	18	16¼	3	16¼	5	22x2 3/16	30	410
3¾	85.00	21½	20½	3	19	5	24x2 7/16	36	480
4	150.00	18	30	3	16¾	7	22x2 3/16	60	1000
4F	200.00	18	39	3	16¾	7	22x2 3/16	79	1350
5	265.00	26	30	4	16	12	24x2 7/16	66	1532
7	425.00	36	34	5	20	35	32x3 7/16	75	3000
8	500.00	36	35	7	35½	35	56x4x4	76	2475
9	550.00	48	35	7	35½	40	56x4x4	78	2940
13	85.00	30	11½	1½	12¼	3	17x1¾	55	435
14	160.00	36	27	3	25¾	7	34x2 7/16	70	1200
15	225.00	36	27	4	25¾	12	34x2 7/16	70	1370
17	350.00	36	28½	4	26¾	35	40x3 7/16	70	2000
40	200.00	22	20	4	15	12	24x2 7/16	40	....
50	......	12	11¼	1½	11¼	3	......	....	....

Niagara Inclinable Presses



No. A5 Master Press

Niagara Inclinable Open Back Power Presses are adapted for a wide range of die operations including cutting, drawing, forming, perforating and bending, as well as combination cutting and drawing.

They are used in the production of an endless variety of metal stampings.

The design and construction of Niagara Inclinable Presses make them fit every job with the greatest degree of convenience, speed, economy and safety. These presses are operated with frame upright for blanking, punching and similar operations in which the punchings drop through the opening in the bed.

When combination or forming dies discharge the work onto the top of the bed, the frame may be inclined so that the pieces automatically drop through the opening in the back. There is practically no change in height of bed when in inclined position.

Series A Master Presses

A one-piece steel casting frame is used in the A-5½, A-5, A-4½ and A-4 sizes. A one-piece high tensile cast iron frame of the same general design is used in the A-3½ and smaller sizes.

Eccentric shafts are furnished with standard strokes on No. A-1¼, A-1¾, A-3 and A-4 presses.

The 6-point engagement clutch provides prompt engagement with subsequent high productive output.

Multiple V gibs on each side of slide are designed for rigidity. This type of gib retains a true bearing under excessive loads.

The slide has equal support for dies from center to front and center to rear. The breech block die clamp is cylindrical in shape and ground to close tolerance.

The backgear shaft is mounted in Timken bearings.

Individual motor drive is located on top of the press.

Standard Series Presses

This series consists of 8 presses with shaft diameters from 2¼ to 4¼ inches.

Frame is one-piece high tensile cast iron made to close specifications; no welds or seams. Metal is scientifically distributed in accordance with the concentration of stresses, assuring rigidity and maintaining accuracy.

It is equipped with a quick acting, heavy duty clutch.

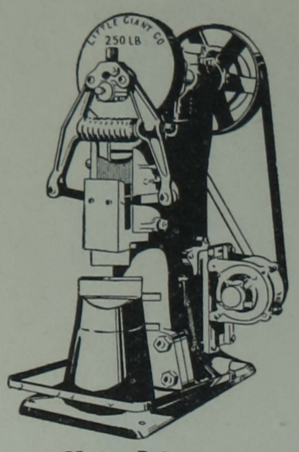
The slide gives balanced support for dies from center to front and center to rear. The breech block die clamp gives secure grip to die shank and solid support to die under pressure. Gibs have bearing surfaces accurately machined to match the V ways in the slide; adjustable and removable.

High tensile cast iron connection with self aligning ball-type connection screw maintains vertical adjustment.

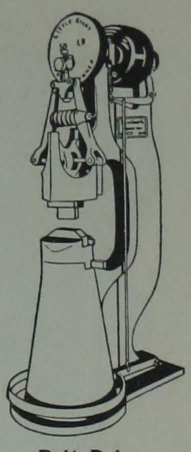
Bearings are split at a 45-degree angle. Eccentric shafts are furnished with standard strokes on Nos. 3-B, 4, 4½, 5, 5½, 7 and 7-B presses.

Prices and Complete Specifications upon Application

Little Giant Power Hammers



Motor-Driven



Belt-Driven

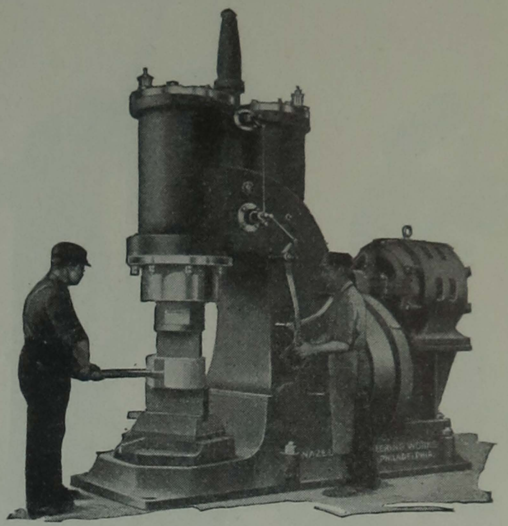
All bearings are designed to stand hard and continuous usage and where necessary are adjustable for wear. Ram connection cushions blow at upper extremity of the Ram and intensifies the blow. Cone type friction clutch gives the operator perfect control of weight and speed of blow and positive instant release.

Size Hammer...............lbs.	**25**	**50**	**100**
Forging Capacity Rd. General Work...in.	2	3	4
Forging Capacity Rd. Quantity Production.in.	1¼	2	2½
Maximum Capacity..........in.	6	6	7
Upper Die Size, Round Face..in.	*3x1½	*3½x1¾	6x3
Upper Die Size, Flat Face....in.	3x2	3½x2½	6x3
Lower Size Die Face.........in.	3x2	3½x2½	6x3
Maximum Length of Stroke..in.	8	11	13
Throat Room, Height.......in.	6	6	7
Throat Room, Depth........in.	10	14	14
Belt Pulley Size, Belt Driven.in.	10x3½	12x4	14x5
Height Over All.............ft.	5⅓	5 11/12	6½
Floor Space Required........in.	16x27	20x30	28x42
Revolutions Strokes....per min.	375	325	275
Weight, Belt Driven........lbs.	870	1600	3000
Price, Belt Driven.........each	**$140.00**	**$210.00**	**$420.00**
Price, Motor Driven with Base and Pulley, No Motor....each	**170.00**	**255.00**	**475.00**
Price, with 60 Cycle 2 or 3 Phase Motor (State Volt)......each	**215.00**	**308.00**	**540.00**
Price, with 110 or 220 Volt 60 Cycle Sg. Ph............each	**225.00**	**333.00**	**600.00**
Price, Combination Pick Point and Chisel Bit Dies......each	Not Used	**85.00**	**100.00**

Size Hammer...............lbs.	**250**	**500**	......
Forging Capacity Rd. General Work..in.	6	7	......
Forging Capacity Rd. Quantity Production.in.	4½	5	......
Maximum Capacity..........in.	15	15	......
Upper Die Size, Round Face..in.	8x3½	10x4½	......
Upper Die Size, Flat Face....in.	8x3½	10x4½	......
Lower Die Size Face.........in.	13x3½	15x4½	......
Maximum Lgth. of Stroke....in.	20	24	......
Throat Room, Height.......in.	12	14	......
Throat Room, Depth........in.	14	15	......
Belt Pulley Size, Belt Driven..in.	18x8	24x9	......
Height Over All.............ft.	7	8⅓	......
Floor Space Required........in.	30x54	32x62	......
Revolutions Strokes....per min.	195	160	......
Weight, Belt Driven........lbs.	5000	10000	......
Price, Belt Driven.........each	**$950.00**	**$1600.00**	......
Price, Motor Driven with Base and Pulley, No Motor....each	**1035.00**	**1725.00**	......
Price, with 60 Cycle 2 or 3 Ph. Motor (State Volt)......each	**1245.00**	**2000.00**	......
Price, with 110 or 220 Volt 60 Cycle Sg. Ph............each	Upon Application		......
Price, Combination Pick Point and Chisel Bit Dies......each	**120.00**	Not Used	......

*25 and 50 pound hammers furnished with rounded face dies unless otherwise specified.

Type B Nazel Electric Driven Hammers



The Nazel Hammer is equipped with 2 cylindrical valves which not only make the operation of the hammer simple, but places it under control of the operator.

After the power is turned on and the valves closed, the ram elevates and remains stationary in a suspended position, allowing free space for the operator to place the work on the lower die, this space being equal to almost the full stroke of the ram.

When valves are opened by means of treadle or hand lever, the ram begins to operate. If opened suddenly, it will strike a quick, hard blow. If opened gently, it will strike a light blow, the force of the blow being increased as the valves continue to be opened. When opened at full port, the force of the blow is very great.

Steam rated size, 800 pounds; 6-inches square stock handled successfully; energy of blow, 4036 foot pounds.

The increased effect of the blow of Nazel Hammers over other types is the result of the following forces: Compressed air over top of ram and vacuum underneath top of ram created by compressor piston in its upward stroke, and compression in the bore of the ram which is produced in every ascending stroke of the ram.

The Nazel Hammer gets under way instantly and strikes the same number of blows per minute whether striking light, medium or hard blows.

It is self-contained, eliminating the use of independent compressors, storage tanks or piping.

For general forging, the Nazel Hammer is ideal, as it consumes power only when running and starts immediately as soon as current is turned on.

For all manner of railroad, machine and general forging, plating, drawing, swaging, collaring, spindle-making, it has proven itself economical and efficient.

Operates with low pressure and maintains a uniform speed at all times.

Specifications

No....................................	**5**
Mild Steel Worked Efficiently..................	6″ Square
No. Blows per Minute..........................	130
Maximum H.P. Required........................	23.5
Requisite Motor (H.P.).........................	25
Desirable Motor Speed.........................	900
Stroke of Ram...........................in.	23½
Distance from Center of Ram to Housing....in.	16¾
Distance Between Dies, Clear Working Space.in.	20¼
Ram Die Surface, Regular..................in.	5x10
Floor Space Required......................in.	110x43
Size of Driving Pulley.....................in.	35x6½
Weight of Hammer without Anvil..........lbs.	13420
Weight of Anvil with Die Holder and Die...lbs.	7480
Approximate Total Weight.................lbs.	20900

Prices upon application.

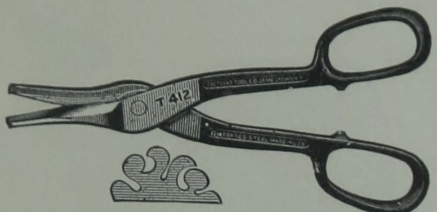
Crescent Tinners' Snips

CRESCENT TOOL CO
JAMESTOWN, N.Y.

Forged of special steel. Blades have keen, strong edge that will retain its sharpness. Powerful leverage makes them cut evenly and smoothly. Has polished blades and blue enameled handles. Packed 1 in a box.

No.	Each	Lgth. In.	Cut In.	Wt. Oz.	No.	Each	Lgth. In.	Cut In.	Wt. Oz.
S47	$.85	7	1¾	7	S411	$1.25	11	2½	19
S48	.90	8	1⅞	8	S412	1.50	12¾	3	25
S49	1.00	9	2	9	S413	1.80	13⅞	3½	32
S410	1.10	10	2¼	13	S414	2.10	14⅞	4	38

Crescent Circular Cutting Snips

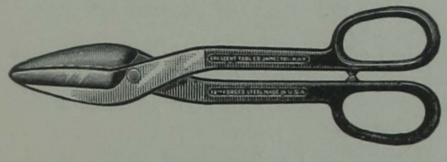


Designed specially for cutting out intricate patterns and curves. They cut smoothly and leave the metal unbent. Have polished blades and blue enameled handles.

Packed 1 in a box.

Number	T47	T412
Each	$1.10	$1.75
Length, inches	7	12
Cut, inches	1¾	3
Weight, Packed, ounces	7	25

Crescent Circular Cutting Snips



Forged steel snips designed after standard circular cutting style. Cut smoothly and easily.

No. U416 is the heavy duty type made for extra heavy service.

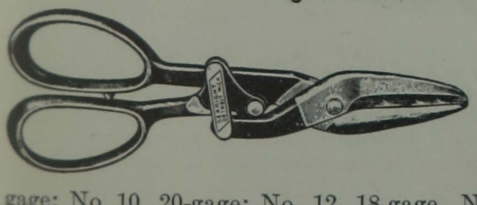
Polished blades. Blue enameled handles.

Packed one in a box.

No.	U412	U416
Each	$1.75	3.00
Length, inches	12¾	16¼
Size Cut, inches	3	2¾
Weight, pounds	1¾	4

Bartlett Compound Lever Snips

Searight Patent

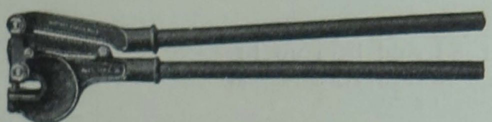


Made from drop-forged crucible tool steel.

No. 7 will easily cut 24-gage or thinner; No. 8 cuts 22-gage; No. 10, 20-gage; No. 12, 18-gage. No. 14 is suitable for heavy benchwork.

Size In.	Each	Total Length Inches	Length Blade Inches	Length Cut Inches	Weight Pounds
7 Stamped	$3.00	7	1½	1¼	5/16
8 Forged	4.50	8	2	1⅝	⅝
10 Forged	6.75	10½	2¾	2⅛	1 5/32
12 Forged	9.00	12	3½	2⅝	1⅞
14 Forged	10.50	14	4⅛	3¼	2 9/16

No. 1 Whitney Punches



This punch has great capacity, is of simple construction, and strongly built.

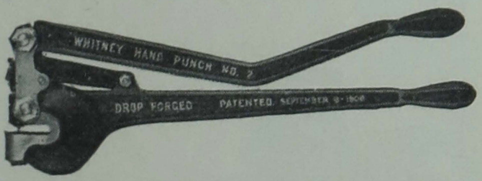
Punches and dies from ⅛ to 9/16 inch, by 64ths.

Insertable pipe handles.

Each punch is equipped with 1 punch and 1 die.

No.	Tool Complete Each	Extra Punches Each	Extra Dies Each	Length Inches	Capacity, In. Hole	Capacity, In. Thickness Iron	Weight Pounds
1	$19.00	$.45	$.45	34	⅜	¼	22

No. 2 Whitney Punches



This punch gives excellent satisfaction in boiler shops, to furnace manufacturers, cornice, tank and stack builders, manufacturing plants and repair shops. One punch and one die included with each punch as equipment.

Punches and dies from 3/32 to ½ inch, by 1/64ths.

Length	inches	23
Capacity Hole	inches	5/16
Thickness Iron	inches	¼
Weight	pounds	13
Price, Tool Complete	each	$15.00
Price, Extra Punches	each	.45
Price, Extra Dies	each	.45

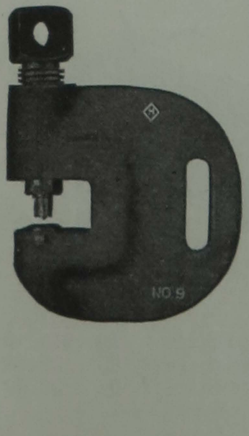
Whitney Channel Iron Punches

WHITNEY HAND PUNCH NO 2
PATENTED SEPTEMBER 8 1908

Punches to center of 4-inch channel iron with 1½-inch flanges. Drop forged. Lower jaw has opening back of die socket that allows channel and angle iron to be inserted through from side and punched in web between flanges.

Length	in.	23
Tool Complete	each	$16.00
Extra Punches (3/32 to ½ by 64ths)	each	.45
Extra Dies (3/32 to ½ by 64ths)	each	.45
Capacity Hole	in.	¼
Thickness Iron	in.	¼
Weight	lbs.	16½

Steel Screw Punches

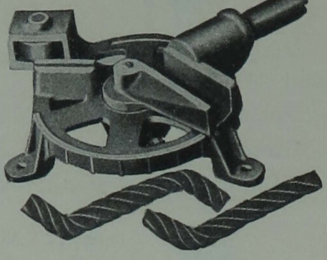


Made of highest grade steel casting having a high tensile strength.

In ordering punches and dies, state size of rivets for which they are to be used. One punch and die furnished with each machine.

No.	Punches Holes for Rivets In.	Will Punch Iron In.	Dis. from Edge of Sheet In.	Wt. Lbs.	Price Each
0	½	¼	1½	15	$24.00
1	½	⅜	1½	24	30.00
2	¾	½	2	38	40.00
3	¾	¾	2½	62	60.00
3½	¾	¾	4	80	75.00
4	1	1	4¼	145	90.00
5	1	⅝	6	200	125.00

No. 5 C. H. & E. Bar Benders



Will bend cold bars up to 1-inch square or twisted square, and 1¼-inch round.

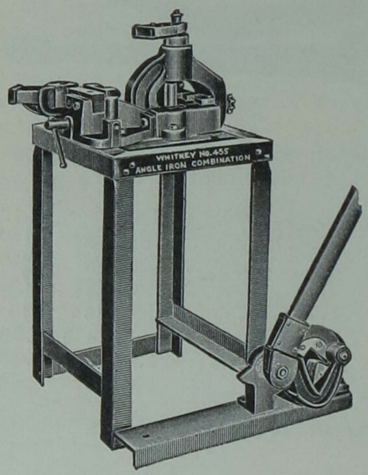
Diameter of bending die, 2 inches. Radius to inside curve of bar at bend, 1 inch. Has roller bearing journal. Guide block has large roller allowing bar to follow.

Weight, without handle, 105 pounds.

Weight of handle, 40 pounds.

Prices upon application.

No. 455 Whitney Angle Iron Combinations



Capacity, 2x2x¼ angle iron.

A unit of this angle iron working machinery completes the up-to-date shop equipment. A dependable machine; no change of die necessary; always ready to use.

Consists of Angle Iron Shear No. 4, Mitre Notcher No. 50, Bender No. 51 and stand.

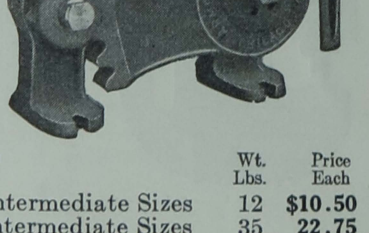
Mitre Notcher No. 50 is built to withstand hard usage, all wearing parts are hardened. Angle is held in position by means of a screw clamp assuring accurate work. The punch enters the die by a special pilot so that the punch will always travel true with the die, again giving another point of accuracy. Inserted tool steel shearing blade in the punch.

The bending attachment is strongly made and is designed for holding angle iron for bending by a screw clamp against a solid jaw, giving the desired accurate bend.

No. 4 Angle Iron Shear has inserted tool steel blades. Also has equal distribution of leverage over entire surface of cutting blades on account of eccentric gear. Made of cast steel and has self-clamping rest pad.
Shipping weight, 270 pounds.

No. **455**, Complete with No. 4 Shear, No. 50 Mitre Notcher, No. 51 Bender and Stand..........each **$225.00**

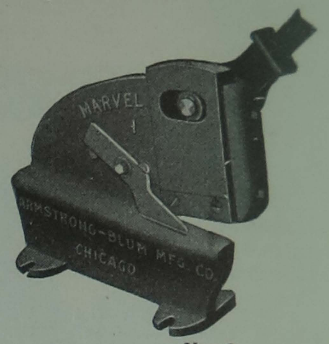
Marvel Rod Cutters



Dies or blades are made of special alloy tool steel, hardened and drawn; have round openings of correct size to cut off rods and wire within the capacity of the machine. Lever is at a convenient height from the bench.
Gauge is handy when cutting a number of pieces the same length.
Complete with lever, gauge and gauge rod.

No.	Cuts Rods Inches	Wt. Lbs.	Price Each
5	⅜, 5/16, ¼, 3/16, ⅛ and Intermediate Sizes	12	**$10.50**
6	⅝, 9/16, ½, 7/16, ⅜ and Intermediate Sizes	35	**22.75**
7	⅞, ¾, ⅝, ½, ⅜ and Intermediate Sizes	95	**39.00**

Marvel Splitting Shears



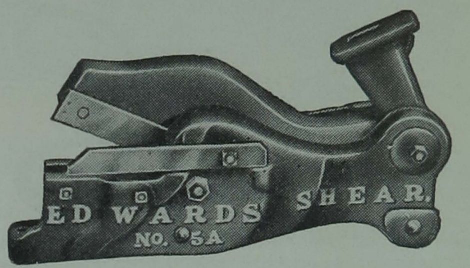
No. 1

This machine is well made and strong. The upper shear bearing is on an angle, thus lessening the strain on the machine. The stripper, or hold down, is so placed that a line on material can be easily followed. Machine shears swinging lever either way.

No. 2 is fitted with an attachment on the eccentric by which the throw of the eccentric can be easily changed.

No.	Shears Sheets Thickness, In.	Length of Blades, In.	Weight Pounds	Price Each
1	⅛	4	55	**$34.00**
2	¼	6	200	**78.00**

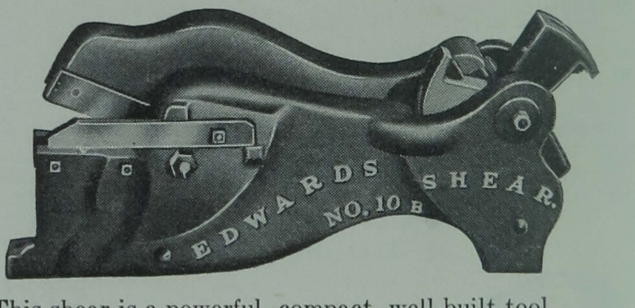
No. 5 Edwards Bar Cutting Shears



Used by contractors, iron workers, repair, forging and body shops. Ideal for cutting small reinforcing bars, corn plow shovels, plow points, etc.
This shear sits low on the floor which gives the operator great leverage and makes it unnecessary to hold up the bar when cutting.
Fastens to the floor only at the front end with a bolt or lag screw permitting the other end to be swung around to any position.
Every machine is tested far beyond its capacity before it leaves the factory.
A 6-foot high carbon steel handle bent at the socket end is furnished with each shear. Knives are 7 inches long.
Cuts mild steel 4x½ inches and ¾ inch round, and plow steel 6½x¼ inches.
Weight with handle, 210 pounds.

No. **5**, with Handle..........................each **$25.90**

No. 10 Edwards Bar Cutting Shears



This shear is a powerful, compact, well-built tool.
The top jaw is moved by a small diameter pinion on which is cast 3 lever sockets standing at different positions. A complete revolution of the pinion closes the jaw. For cutting narrow bars, only a partial revolution is necessary.
Every machine is tested far beyond its capacity before it leaves the factory.
A 7-foot high carbon steel handle bent at the socket end is furnished with each shear.
The shear fastens to the floor only at the front end. The low construction gives the operator great power and makes it unnecessary to hold up the end of long bars when cutting.
Cuts mild steel 4x¾ inches and 1 inch round.
Knives are 7 inches long.
Weight with handle, 490 pounds.

No. **10**, with Handle..........................each **$44.95**

Machine Tool Builders Represented

Arbor Presses
Edw. E. Bartlett Co.
Little Giant Co.

Balancing Ways
Anderson Bros. Mfg. Co.

Bending Machines
Henry Pels & Co.
Wallace Supplies Mfg. Co.

Bolt Threading Machines
Oster-Williams Manufacturing Co.

Boring Machines
King Machine Co. (Vertical)
Universal Boring Machine Co. (Horizontal)

Broaching Machines
American Broach & Machine Co.

Drilling Machines
Canedy-Otto Mfg. Co. (Upright & Bench)
Champion Blower & Forge Co.
Cincinnati Bickford Tool Co. (Upright & Radial)
Hisey Wolf Machine Co. (Electric)
Sibley Machine Co. (Upright)
United States Electrical Tool Co. (Electric)

Flanging Machines
Morey, Jones & Lovell Co.

Gear Shapers
Fellows Gear Shaper Co.

Grinders
Bryant Chucking Grinder Co.
Covel Manufacturing Co.
Hanchett Manufacturing Co.
Hisey Wolf Machine Co. (Electric)
Norton Company
United States Electrical Tool Co. (Electric)

Grinding Spindles
Bryant Chucking Grinder Co.
Ex-Cell-O Tool & Mfg. Co.

Hobbing Machines
Barber-Colman Co.

Keyseating Machines
John T. Burr & Son (Portable)
Little Giant Co.
Mitts & Merrill

Lathes
Foster Machine Co. (Turret)
International Machine Tool Co. (Turret)
Lodge & Shipley Machine Tool Co.
Sebastian Lathe Co.
Rahn-Larmon Co. (Gap)
Rivett Lathe & Grinder Corp. (Bench)

Milling Machines
Kearney & Trecker Corp.
Burke Machine Tool Co. (Bench Type)

Multiple Spindle Heads
Hoefer Mfg. Co.

Nibbling Machines
Andrew C. Campbell, Inc.

Pipe Threading Machines
Curtis & Curtis
Greenfield Tap & Die Corp.
Oster-Williams Manufacturing Co.
Toledo Pipe Threading Co.

Planers
G. A. Gray Co.

Polishing & Grinding Machines
Hisey-Wolf Machine Co.
United States Electrical Tool Co.

Power Hammers
Erie Foundry Co. (Steam)
Little Giant Co.

Power Presses
V & O Press Co.

Power Saws
Armstrong Blum Mfg. Co.
Racine Tool & Machine Co.

Power Scrapers
Anderson Bros. Mfg. Co.

Press Brake
Cincinnati Shaper Co.

Punching & Shearing Machines
Henry Pels & Co.

Radial Drills
Cincinnati Bickford Tool Co.

Riveting Machines
John F. Allen Co.
Peck Stow & Wilcox Co.

Screw Machines
Foster Machine Co.

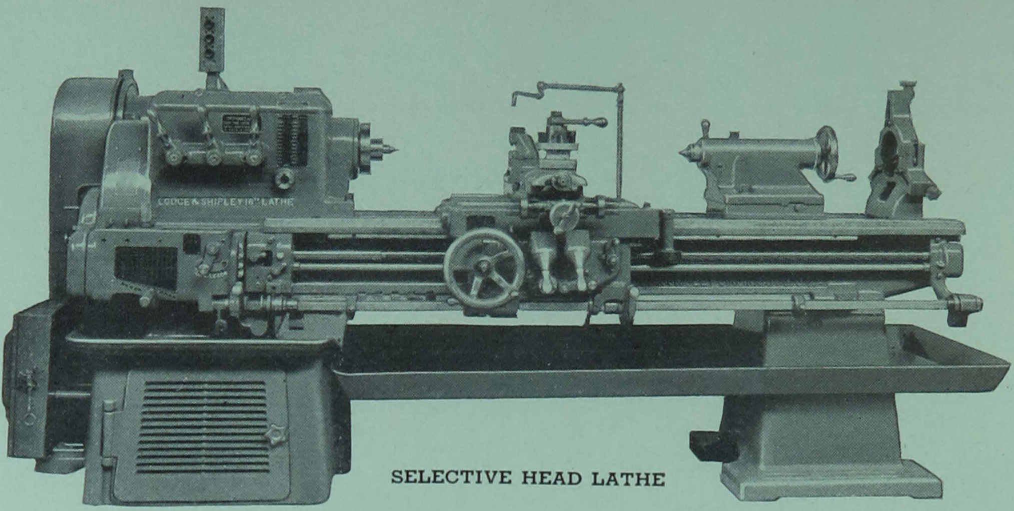
Shapers
Cincinnati Shaper Co.
Western Machine Tool Co. (STEPTOE)

Shaper-Planer
Rockford Machine Tool Co.

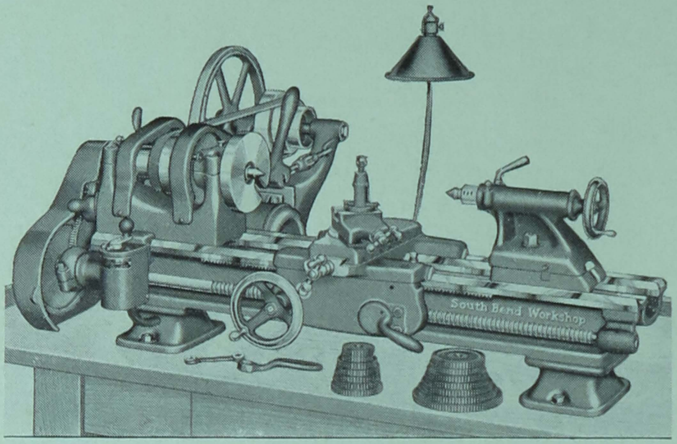
Sheet Metal Tools
Niagara Machine & Tool Works
Peck Stow & Wilcox Co.

Spring Coiling Machinery
Sleeper & Hartley Inc.

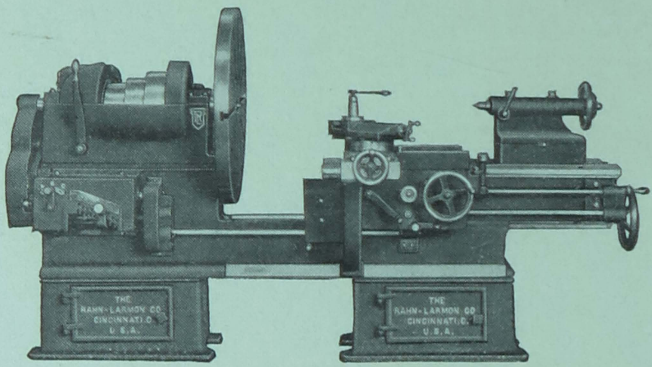
Turret Lathes
International Machine Tool Co. (LIBBY)
Foster Machine Co.


LODGE & SHIPLEY 16" LATHE

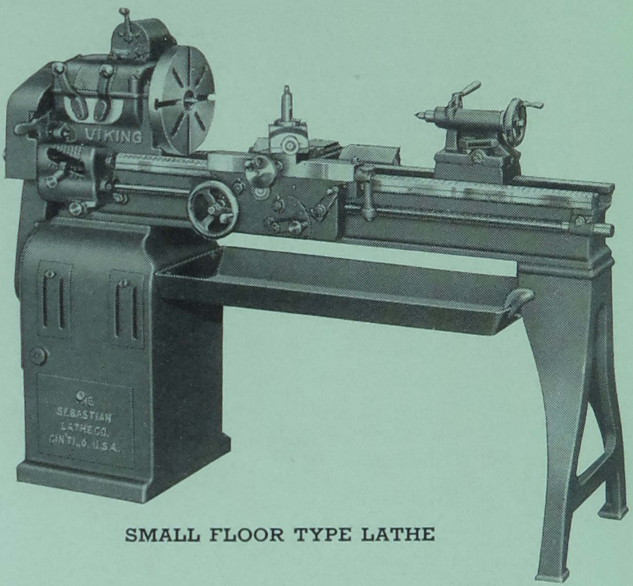
SELECTIVE HEAD LATHE


South Bend Workshop

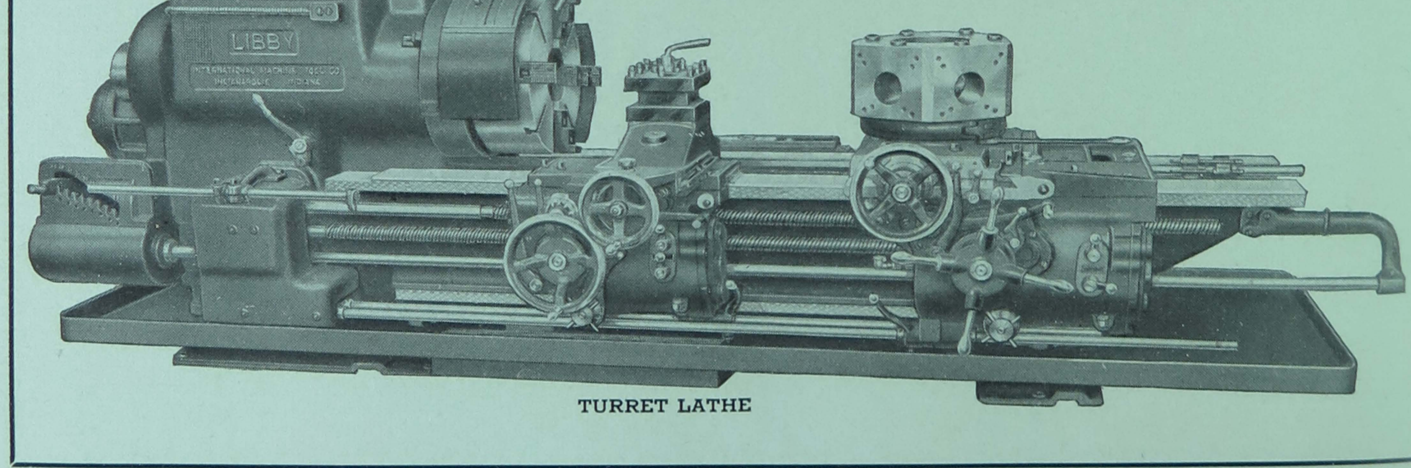
BENCH LATHE


THE RAHN-LARMON CO CINCINNATI, O. U.S.A.
THE RAHN-LARMON CO CINCINNATI, O. U.S.A.

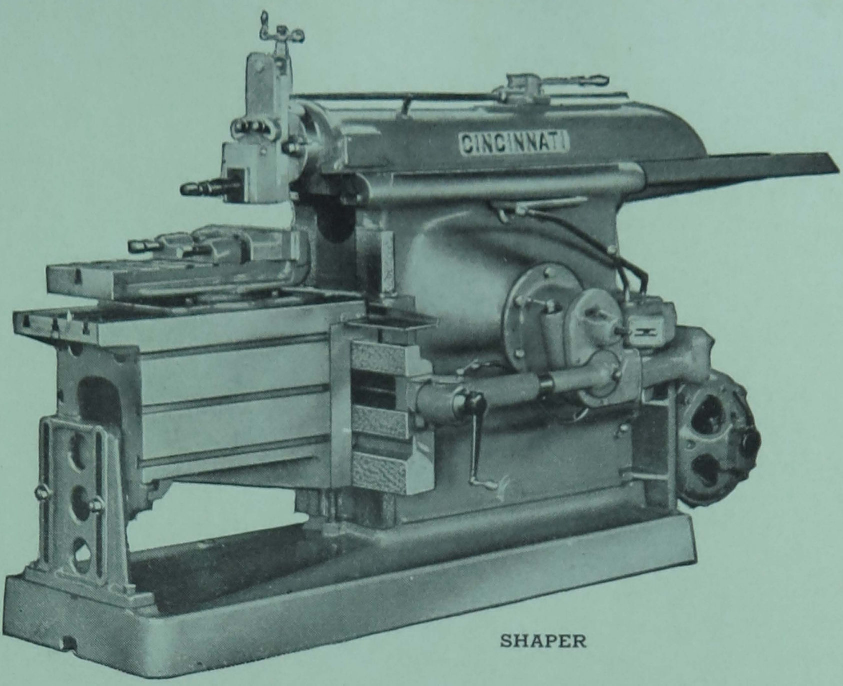
GAP LATHE


VIKING
THE SEBASTIAN LATHE CO. CIN'TI, O. U.S.A.

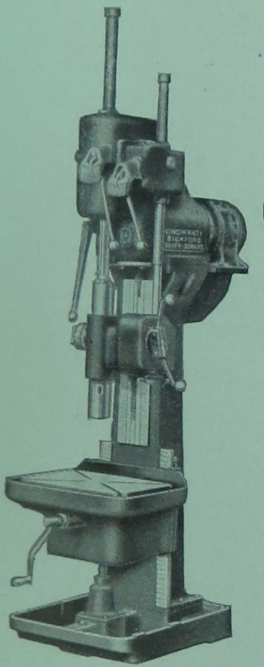
SMALL FLOOR TYPE LATHE


LIBBY
INTERNATIONAL MACHINE TOOL CO
INDIANAPOLIS INDIANA

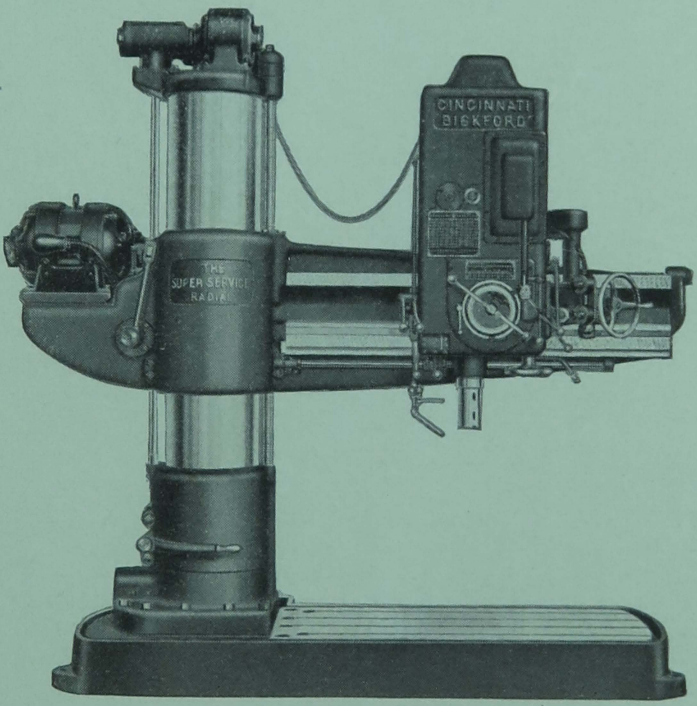
TURRET LATHE


CINCINNATI

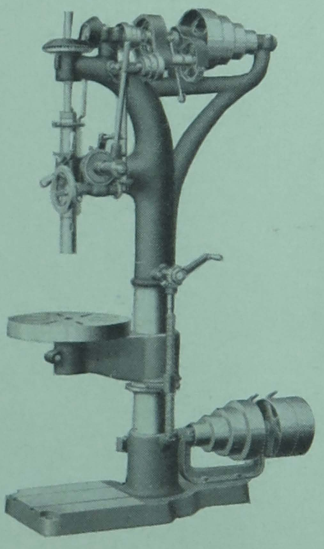
SHAPER



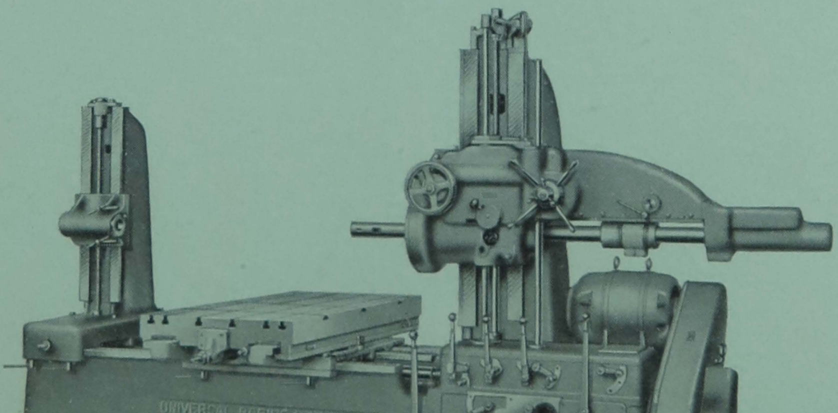
HEAVY UPRIGHT DRILL


CINCINNATI BICKFORD
THE SUPER SERVICE RADIAL

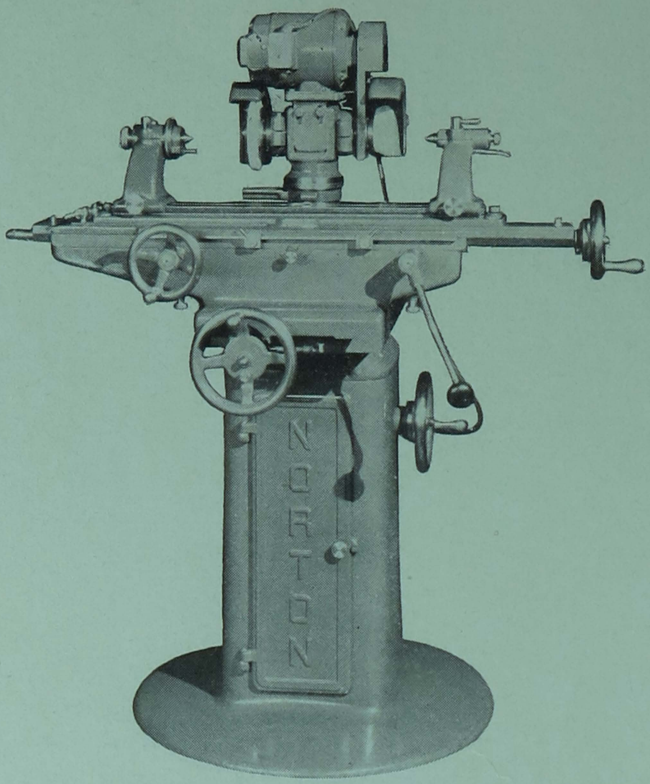
RADIAL DRILL



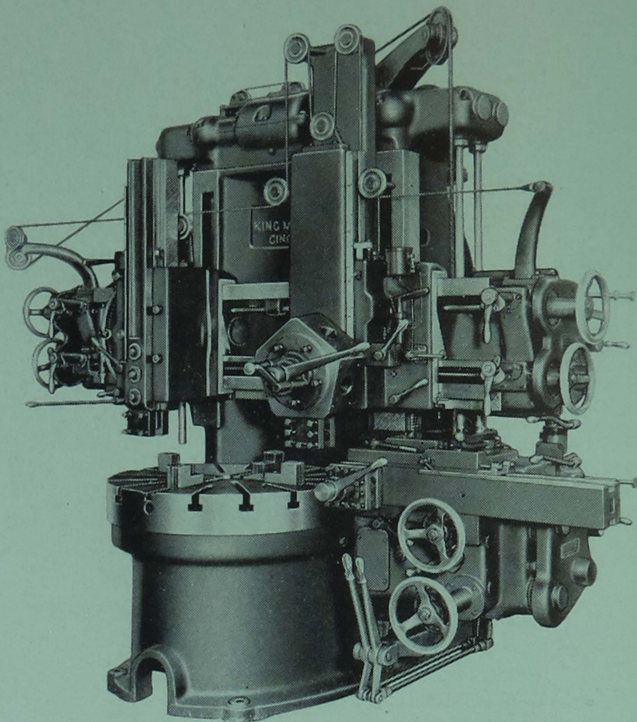
UPRIGHT DRILL


UNIVERSAL BORING MACHINE CO
HUDSON MASS U.S.A.

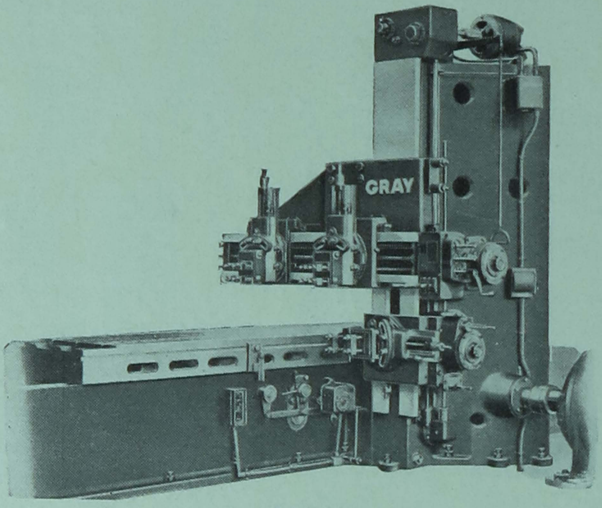
HORIZONTAL BORING MILL



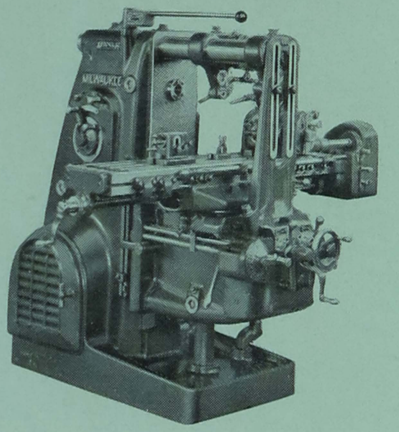
UNIVERSAL TOOL AND CUTTER GRINDER



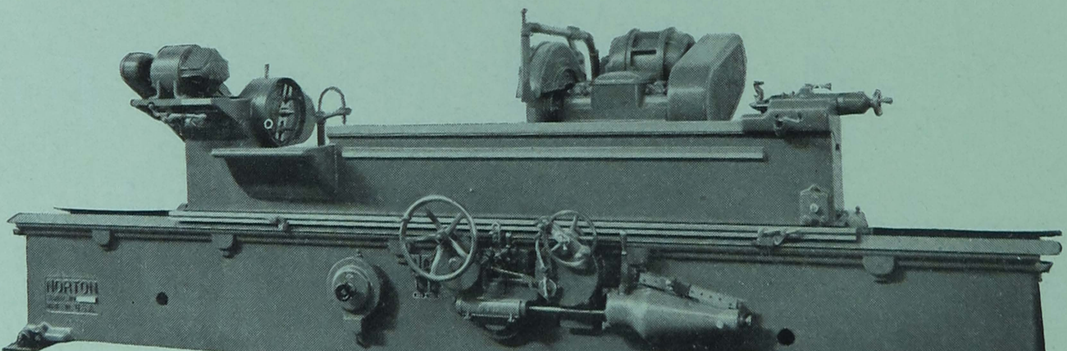
VERTICAL BORING AND TURNING MILL



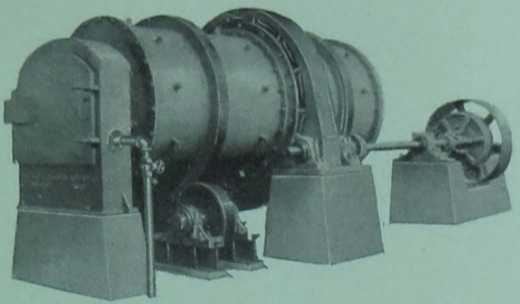
PLANER



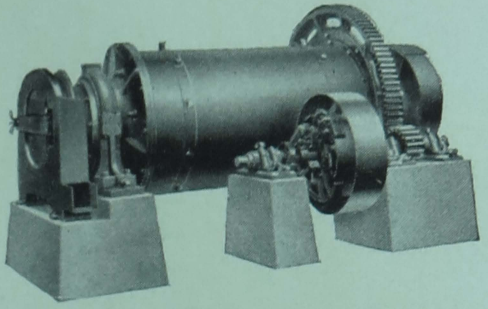
MILLING MACHINE



PISTON ROD GRINDER



MARCY OPEN-END ROD MILL—TIRE TYPE



MARCY OPEN-END ROD MILL—TRUNNION TYPE

Ore Dressing

FOR more than 40 years The Mine and Smelter Supply Company has been recognized by the mining industry throughout the world as a leader in manufacturing and distributing ore milling machinery and mining supplies.

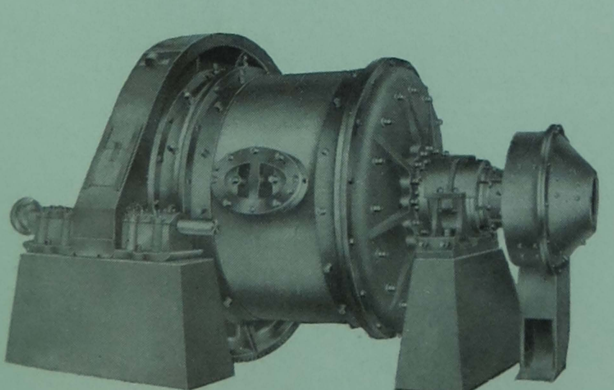
The Wilfley Concentrating Table, developed for the treatment of sand and slime products, revolutionized mining. Through its use the mining and milling of many low grade ores were made profitable.

The Marcy Ball, Rod and Tube Mills, because of their greater efficiency, have replaced the earlier types of ore reduction machinery. These mills are being operated in nearly every important mining camp throughout the world and have also been adapted to the grinding problems of many other industries.

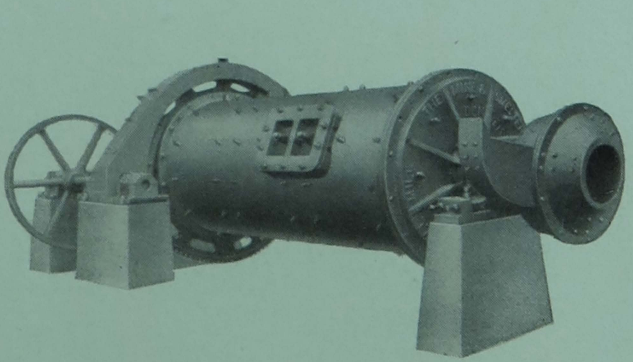
The Marcy Mill Division is prepared to supply complete equipment and accessories for milling, smelting and refining processes. Our engineering and manufacturing facilities are available for the production of special equipment made to drawings and specifications.

THE MINE AND SMELTER SUPPLY CO.

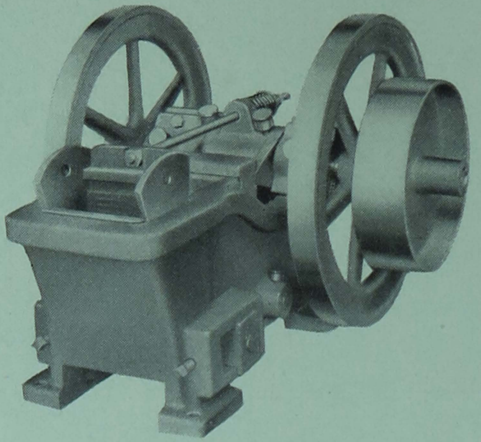
Marcy Mill Division



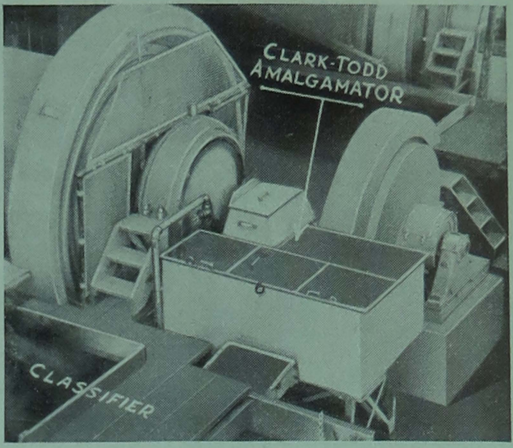
MARCY BALL MILL



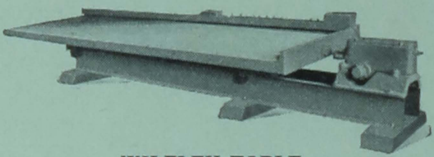
MARCY TUBE MILL



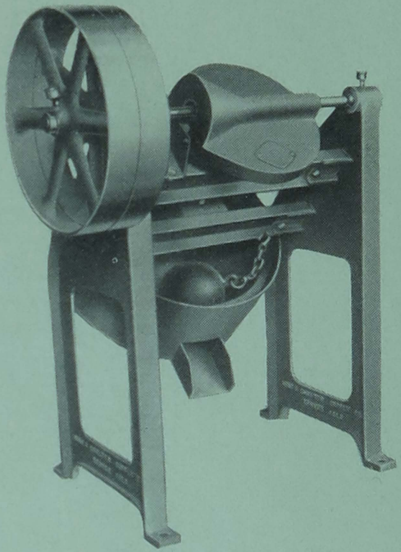
MASSCO JAW CRUSHER


CLARK-TODD AMALGAMATOR
CLASSIFIER

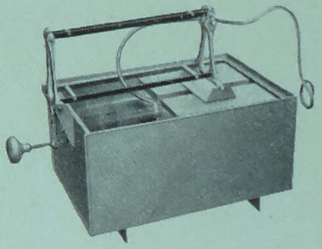
CLARK-TODD AMALGAMATOR



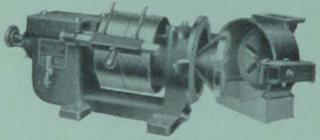
WILFLEY TABLE



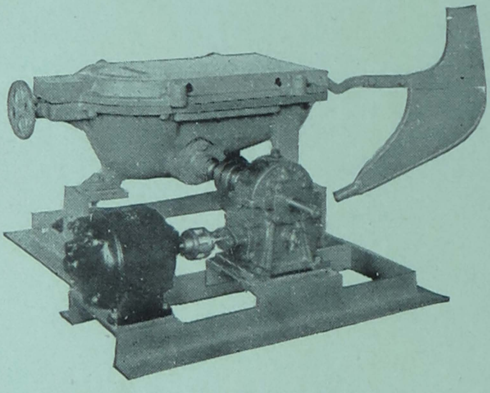
MASSCO CLEANUP PAN



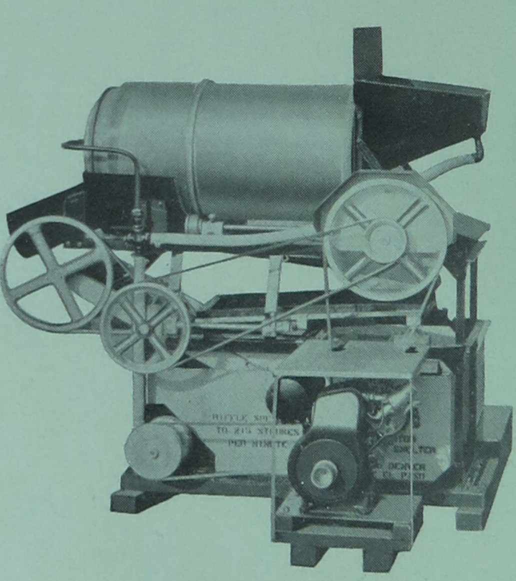
ADAMS REAGENT FEEDER



McCOOL PULVERIZER

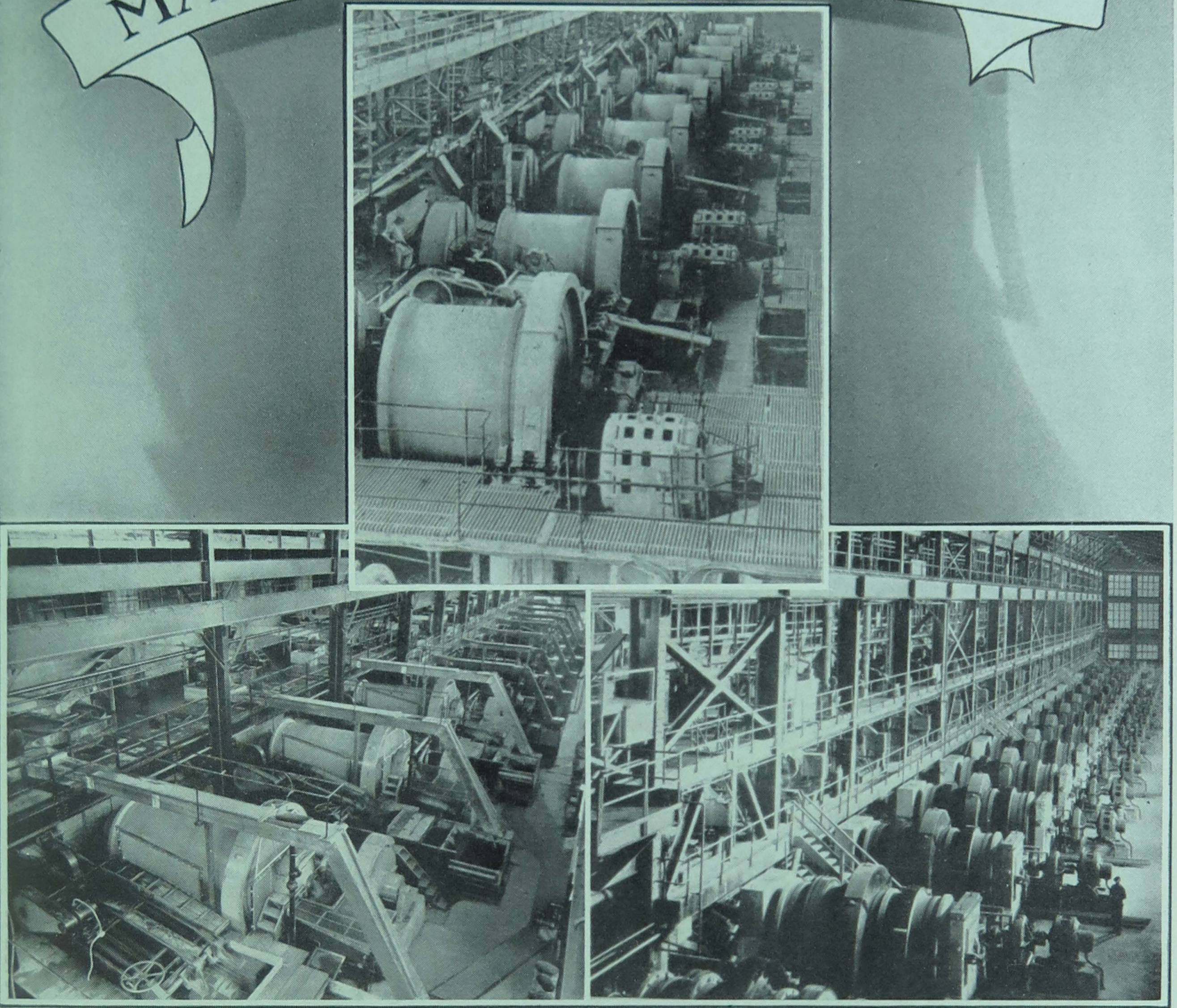


SCOBY SAMPLER

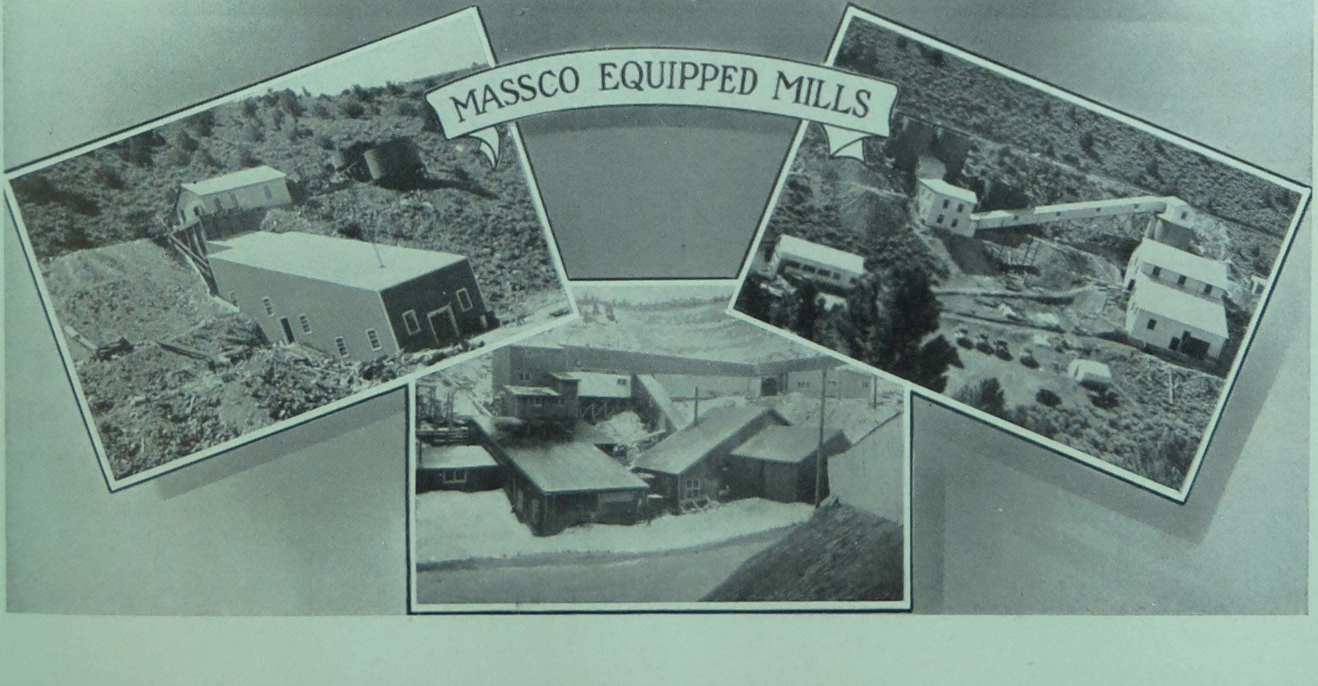


G-B PLACER MACHINES

MARCY GRINDING UNITS



MASSCO EQUIPPED MILLS



The

Mine and Smelter Supply Co.

are also

Distributors of

Electrical Supplies and Equipment

Central Station Equipment, Meters
Motors, Poles, Wire, Conduits, Line
Hardware, Street Lighting Equipment

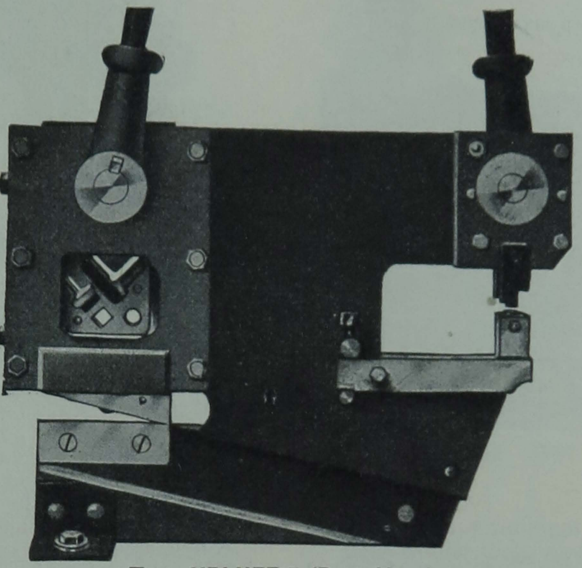
Telephone and Signal Apparatus

Wiring Devices, Lamps

AGENTS FOR
W
WESTINGHOUSE ELECTRIC

The Mine and Smelter Supply Company are the
exclusive Agent-Jobbers for the Westinghouse
Electric and Manufacturing Company
in this territory.

Type HBLUEF Pels Triple Combined Punch, Splitting Shear, Bar, Angle and Tee Cutter



Type HBLUEF-7 (Back View)

This is a combination of three excellent tools.

With the same pair of blades angles, tees, rounds and squares can be cut; additional blades can be supplied for shearing beams, channels or special sections. Angles and tees can also be cut on the bevel at any angle up to 45° right or left hand.

On the shears, plates of any length and width can be cut right across the center, while the punching machine will punch through plates, webs and flanges of beams, channels, etc.

Type HBLUEF-7 is worked by a direct acting eccentric lever, the other sizes by a ratchet wheel and lever.

Sizes 10, 13 and 16 have a double speed gear. In size 20, the shears and bar-cutter have treble speed gear.

The equipment furnished with each machine includes one pair of shear blades, one punch, one flat die and one slanting die for the maximum capacity, and one pair of blades for cutting rounds, squares, angles and tees, with hold-down, adjustable stops for cutting bevels, as well as set of wrenches.

Machines are furnished as illustrated, for bolting to the floor, or mounted on 4-wheel trucks.

Type HBLUEF—Size No.	**7**	**10**	**13**	**16**	**20**
Will Shear: Plates . . . up to in.	¼	⅜	½	⅝	¾
Will Shear: Flats . . . up to in.	2x⅜	2 3/16x½	2½x½	3¼x⅝	3⅜x⅞
Will Punch: Holes . . . diam. up to in.	½	⅝	⅝	⅝	¾
Will Punch: Through Plates . . . up to in.	5/16	⅜	½	⅝	¾
Will Punch: Through Webs of Beams . . . from in.	3x1½x4 lbs.	3x1½x4 lbs.	3x1½x4 lbs.	3x1½x 4 lbs.	3x1½x 4 lbs.
up to in.	9x4 x21 lbs.	10x4½x25 lbs.	14x6 x46 lbs.	15x6 x59 lbs.	16x6 x62 lbs.
Will Punch: Through Webs of Channels from in.	3x1½	3x1½	3x1½	3x1½	3x1½
up to in.	8x2½	12x3½x25 lbs.	12x3½x26 lbs.	12x3½x32 lbs.	15x4 x42 lbs.
Will Punch: Through Flanges of Beams . . . from in.	3x1½x4 lbs.	3x1½x 4 lbs.	3x1½x 4 lbs.	3x1½x 4 lbs.	3x1½x 4 lbs.
up to in.	6x3 x12 lbs.	8x3 x18 lbs.	9x4 x21 lbs.	12x5 x32 lbs.	15x5 x42 lbs.
Will Punch: Through Flanges of Channels from in.	3x1½	3x1½	3x1½	3½x2	3½x2
up to in.	6x2½	7x3 x14, 22 lbs.	12x3½x26 lbs.	12x3½x26 lbs.	15x4 x42 lbs.
Will Cut without Change of Blades: Rounds . . . up to in.	⅝	⅞	1	1¼	1½
Will Cut without Change of Blades: Squares . . . up to in.	⅝	¾	1	1⅛	1¼
Will Cut without Change of Blades: Angles Square Across . up to in.	1½x1½x⅛	2 x2 x¼	2½x2½x⅜	3 x3 x7/16	4 x4 x7/16
Will Cut without Change of Blades: Angles on the Bevel up to 45° . . . up to in.	1 x1 x⅛	1⅜x1⅜x¼	1½x1½x3/16	2¼x2¼x¼	2½x2½x5/16
Will Cut without Change of Blades: Tees Square Across . . . up to in.	1½x1½x⅛	2 x2 x¼	2½x2½x⅜	3 x3 x7/16	4 x4 x7/16
Will Cut without Change of Blades: Tees (Stems) on the Bevel up to 45° . . . up to in.	1 x1 x⅛	1⅜x1⅜x¼	1½x1½x3/16	2¼x2¼x¼	2½x2½x5/16
Gap of Punch . . . in.	6	6	7½	8⅝	10¼
Length of Stroke of Shears . . . in.	15/16	15/16	15/16	1	1⅛
Length of Stroke of Punch . . . in.	½	⅝	¾	⅞	1
Length of Stroke of Bar Cutter . . . in.	15/16	15/16	15/16	1	1⅛
Length of Shear Blades . . . in.	6⅜	6⅜	6⅜	7	8
*Will Notch with Special Upper Blade: Angles . . . up to in.	1¾x1¾x3/16	2½x2½x¼	2¾x2¾x⅜	3¼x3¼x⅜	3½x3½x½
*Will Notch with Special Upper Blade: Tables and Stems of Tees . . . up to in.	1¾x1¾x3/16	2½x2½x¼	2¾x2¾x⅜	3¼x3¼x⅜	3½x3½x½
Bar Cutter will Cut by Means of Interchangeable Blades: Beams . . . up to in.	..	..	3x1½x4 lbs.	4x1¾x5 lbs.	4¾x1¾x6.5 lbs.
Bar Cutter will Cut by Means of Interchangeable Blades: Channels . . . up to in.	..	..	3x1½x4.6 lbs.	4x2 x7 lbs.	4 x2 x8 lbs.
Bar Cutter will Cut by Means of Interchangeable Blades: Zees . . . up to in.	..	..	..	..	3x2½x3
Net Weight of Stationary Machine . . . pounds	290	530	730	1170	1980
Shipping Weight of Stationary Machine . . pounds	340	585	850	1320	2245
Weight of Truck . . . pounds	128	130	130	205	210

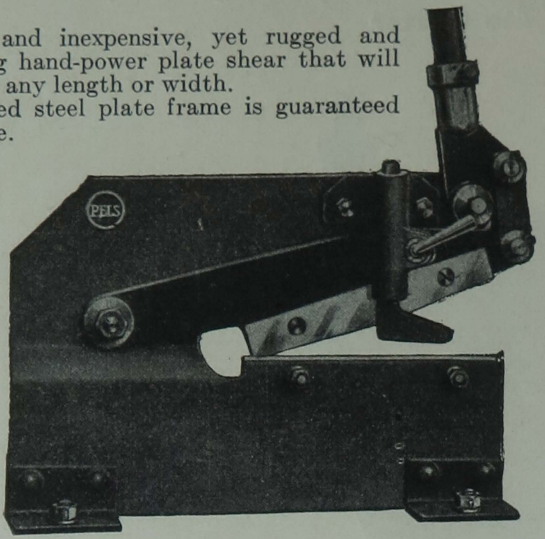
*This blade is suitable for notching both angles and tees.

Prices upon application.

Type HB Pels Long Blade Plate Shears

A light and inexpensive, yet rugged and rapid-acting hand-power plate shear that will cut plate of any length or width.

The forged steel plate frame is guaranteed unbreakable.



Type HB-5

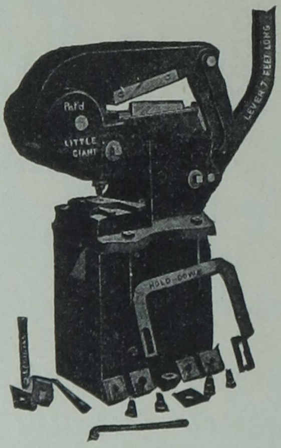
Extra long knives for making maximum cuts at each stroke, facilitate feeding and speed up production.

The improved hold-down is placed close to the knives and is quickly adjustable by the hand lever.

Type		HB-5	HB-7
Splits Plate	inches	3/16	1/4
Flats, at One Stroke	inches	2x5/16	2x3/8 or 2 1/2x5/16
Round Bars, up to	inches	.....	3/4
Square Bars, up to	inches	.....	5/8
Length of Knives	inches	10 1/4	10 1/4
Length of Stroke	inches	1 3/4	1 3/4
Weight	pounds	100	198

Prices upon application.

Little Giant Combined Punches and Shears



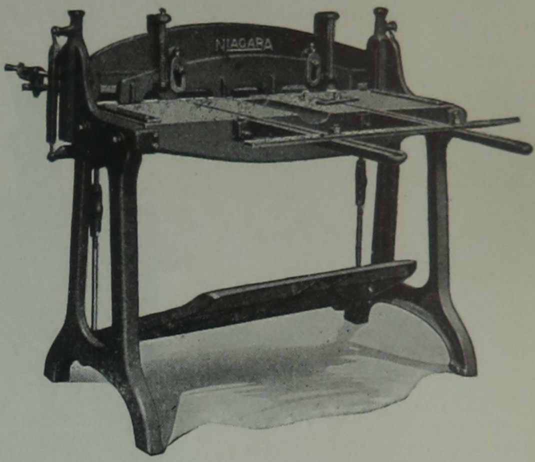
A simple, durable, strong combined punch and shear for blacksmiths, wagon makers, carriage makers, machine shop use, implement manufacturers and all metal workers.

One hundred pounds pressure on the lever gives 25000 pounds pressure on the punch.

Special punches and dies can be furnished on order at additional cost.

Size		1	2	3
Cuts Flat Iron	inches	5/8x2 1/2	1/2x4	3/8x4
" Band "	"	1/4x8	1/4x7	1/4x6
" Round "	"	1	7/8	3/4
Will Punch Hole	"	5/8	1/2	3/8
Will Punch In Iron	"	1/2	1/2	3/8
" " from Edge	"	3 1/2	2 3/4	2 1/2
Size, Punches and Dies with Each Machine	inches	5/8, 1/2, 7/16 3/8, 5/16	5/8, 1/2 7/16 3/8, 5/16	1/2, 7/16, 3/8 5/16, 1/4
Weight	pounds	525	350	280
Price, Complete	each	**$80.00**	**$62.50**	**$50.00**
Extra Punches and Dies	"	.75	.75	.75

Queen City Foot Squaring Shears



Capacity, No. 18 gauge iron and lighter. For use in sheet metal shops where power squaring shears cannot be installed, being intended for cutting the sheets to the required dimensions accurately and to good advantage.

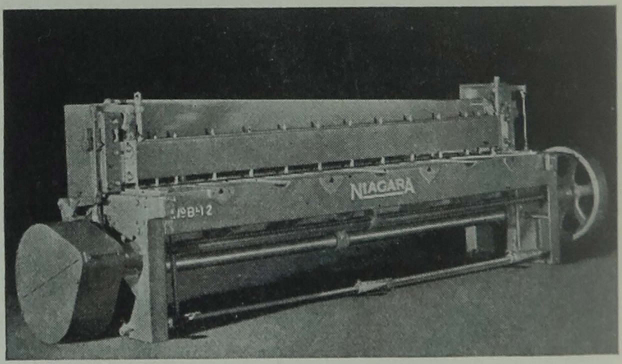
Bed, to which the lower knife is attached, can be shifted on its seats in adjusting the knives, and it is then bolted to the housings. Knives are made of high grade steel welded to a soft steel backing, heat treated to yield a high degree of hardness. The knives are ground true and fit without lining. For cutting cloth, cardboard, fiber, etc., the upper knife can be made with a long bevel, at extra charge.

A set of front, back, bevel and side gauges are furnished. The table and brackets for the front gauge have T slots.

The 52-inch squaring shears have steel treadle. The hold-down holds the sheet while being cut and has one or more openings to enable the operator to see the cutting line.

Size	inches	**22**	**30**	**36**	**42**	**52**
Ship. Weight	lbs.	365	500	645	780	1000
Each		**$85.00**	**95.00**	**115.00**	**140.00**	**200.00**

Geared Power Squaring Shears

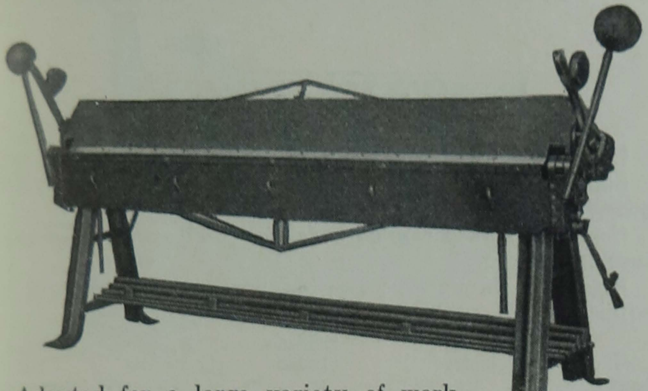


Motor speed for individual drive, 1500–1800 r.p.m.

No.		BL-6	BL-8	BL-10	BL-12
Mild Steel Capacity	ga.	10	10	10	12
Nominal Cutting Length	in.	72	96	120	144
Size of Knives	in.	3/4x4	3/4x4	3/4x4	3/4x4
Length of Knives	in.	74	98	122	146
Distance between Uprights	in.	76	100	124	148
Back Gage Range	in.	18	18	18	18
Front Gage Range	in.	46	46	46	46
Flywheel, Diam. and Face	in.	25x5	25x5	25x5	25x5
Flywheel Speed	r.p.m.	360	360	360	360
Ratio of Gearing		1:6	1:6	1:6	1:6
Strokes	r.p.m.	60	60	60	60
Approx. H.P. Required		5	5	5	7 1/2
Floor Space Over All, Without Front Brackets	in.	51x114	51x138	51x162	51x186
Floor Space Over All, With Front Brackets	in.	82x114	82x138	82x162	82x186
Height Over All	in.	54	54	54	56
Approx. Ship. Wt., without Motor	lbs.	5800	7000	8300	10000

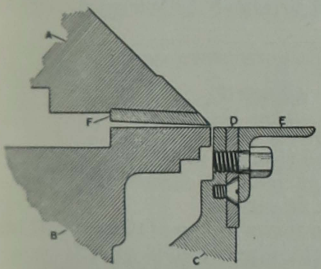
Prices upon application.

Chicago Steel Hand Bending Brakes



Adapted for a large variety of work, such as cornice, gutter, square and octagon pipe, skylights, flashing, ridge roll, roofing ventilating, furnace, auto radiator, fender and body, soda fountains, tanks, corrugated drainboards, etc. Being constructed of steel throughout, it is light in weight but strong and rigid. Will stand hard usage and will not spring or warp.

Each end clamps independently on brakes over four feet long. The top jaw opens wide and adjustment is provided for clamping pressure. The bending leaf is perfectly balanced. Provision is made on both ends to allow for the bending of work on which a crosswise flange has been bent. Set screws provide adjustment of upper jaw forward and back for light or heavy material and sharp or rounding bends.



Cross Section of Steel Edges

Special manganese steel bending edges are provided to withstand wear and maintain extreme accuracy under continuous hard use.

The illustration at the left shows a cross section of the bending edges. A is the upper jaw, B the lower jaw, C the apron or bending leaf, D the detachable ¼-inch bar, E the detachable angle extension for heavy bending and F the special steel edge. Angle E and bar D are removable for making as close as ¼-inch reverse bends on light metal. F and D are made of special hard steel alloy to withstand wear.

The rated capacity is for mild sheet steel and for bending a flange of one inch or wider on sheets of full capacity. Narrower flanges can be bent on lighter metal in proportion.

Regularly furnished with improved adjustable stop gauge for regulating angle of bends and wrenches to fit adjustable parts. Moulding forms are not included in prices. An extra charge is made for set of five moulding forms and clamps. Special gauges, attachments or changes in construction quoted on upon receipt of full particulars regarding requirements.

New No.	Old No.	Each	Length Feet	Length Inches	Capacity Gauge	Weight Pounds
312	....	**$165.00**	3	½	12	940
314	5B	**120.00**	3	½	14	690
316	6B	**95.00**	3	½	16	470
412	....	**175.00**	4	½	12	1250
414	5	**135.00**	4	½	14	810
416	6	**105.00**	4	½	16	585
512	....	**235.00**	5	1	12	1480
514	....	**205.00**	5	1	14	1230
516	....	**155.00**	5	1	16	1010
518	4C	**120.00**	5	1	18	710
612	....	**275.00**	6	1	12	2015
614	17	**220.00**	6	1	14	1625
616	3B	**175.00**	6	1	16	1135
618	4B	**135.00**	6	1	18	820
812	....	**370.00**	8	1	12	2570
814	2C	**285.00**	8	1	14	2050
816	3	**210.00**	8	1	16	1470
818	4	**155.00**	8	1	18	1010
1014	1B	**400.00**	10	1	14	3025
1016	2	**335.00**	10	1	16	2440
1018	2B	**285.00**	10	1	18	2040
1218	1	**500.00**	12	1	18	4275
1222	....	**410.00**	12	1	22	2745

No. 114 Throatless Shears

Capacity, ¼ inch and lighter. Cuts to 5½-inch radius.

Cutters, size 5⅞x1⅜ inches. One cutter knurled to feed material.

Speed, 315 R.P.M. Cuts 6 feet per minute. A friction clutch pulley is furnished with belt drive shears and a friction clutch gear is furnished with motor drive which enables the operator to stop the shear and allow the motor to remain running.

Size of pulley, 14x3½ inches.

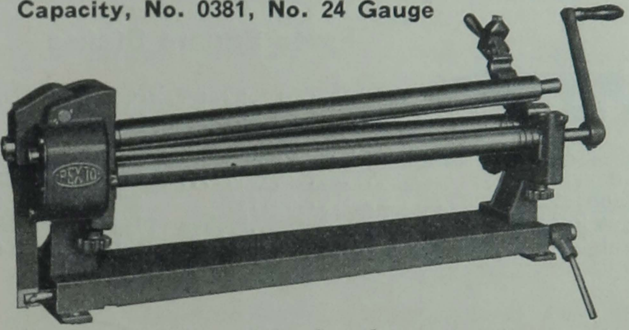
Motor required, 1 H.P., 1750 R.P.M.

Floor space required, 26x26 inches.

No. **114-P**, Belt Power, Ship. Weight, 1200 Lbs......each **$360.00**
No. **114-M**, Motor Drive, Ship. Weight, 1300 Lbs......each **400.00**

Pexto New Lightning Slip Roll Formers

Capacity, No. 22 Gauge Iron and Lighter
Capacity, No. 0381, No. 24 Gauge



All operations are performed at the crank end of machine. Gripping rolls have an extreme clearance of ½ inch. Gears are of steel machine cut and are compensating. They will remain in mesh regardless of amount of opening between gripping rolls. Tilting device for upper roll is operated by a small handle.

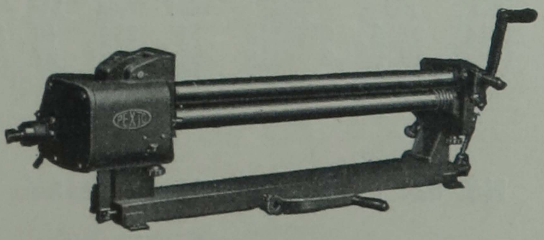
Fitted with tight, or tight and loose pulleys and iron floor legs when ordered.

No.	**382**	**381**	**0381**
Length Rolls for Sheets, Width.......in.	30	36	42
Diameter Rolls....................in.	2	2	2
Shipping Weight..................lbs.	240	260	290

Prices upon application.

Pexto Lightning Slip Roll Formers

Capacity, No. 390, 16 and 18-Gage Steel and Lighter
No. 391, 18 and 20-Gage Steel and Lighter



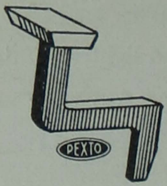
Compensating gears solid steel machine cut, remaining in mesh and fully enclosed, permitting adjustment of lower roll for clearance in order not to cause closing of locks previously formed on sheets. Housings mounted on steel base. Rolls are high carbon steel, ground, smoothly finished, and provided with grooves for forming work that has been wired. External gear cups for idler gears in gear case.

Can be furnished with tight, or tight and loose pulleys and floor legs, also for belted motor drive when mounted on floor legs. Front upper and lower rolls are driven. All three rolls can be supplied driven at extra cost.

No.	**390**	**391**
For Sheets, Width..................in.	36	42
Diameter Rolls......................in.	2½	2½
Ratio of Gearing..........................	2.4 to 1	2.4 to 1
Shipping Weight....................lbs.	495	525

Prices upon application.

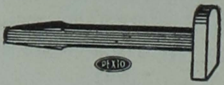
Pexto Bevel Edge Square Stakes



High Carbon Steel with Faces Hardened and Tempered

No.	Size, Face Inches	Weight Pounds	Price Each
931	3 x5	16	**$18.00**
932	2½x4½	14	**16.00**

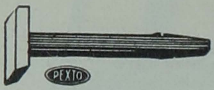
No. 935 Pexto Coppersmiths' Square Stakes



High carbon steel, with face hardened and tempered.

No.	Size, Face Inches	Weight Pounds	Each
935	2¾x4½	11	**$14.00**

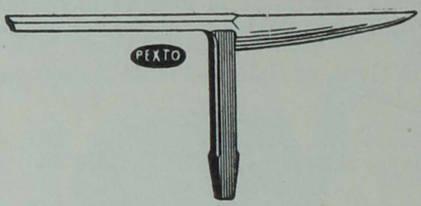
Pexto Square Stakes



Cast steel shank with steel face, hardened and tempered.

No	936	938
Each	**$7.00**	**9.00**
Size Face inches	2¾x4½	3x5
Weight pounds	11	14

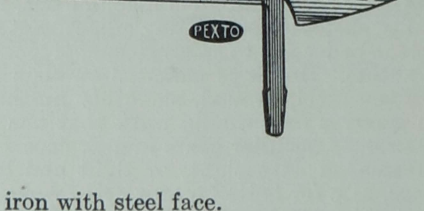
Pexto Beakhorn Stakes



Wrought iron with steel face.
Packed as ordered.

No.	Length, In. Round End	Length, In. Flat End	Flat End Tapers Inches	Diam. at Smallest End, In. Smallest Point	Diam. at Smallest End, In. Longest Point	Wt. Lbs.	Price Each
901	16½	21½	2½x1⅞	⅞	2½	46	**$44.00**
904	14	19	2 x1½	⅝	2	27	**40.00**

No. 925 Pexto Blow Horn Stakes

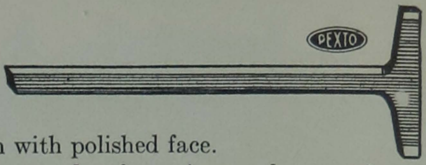


Wrought iron with steel face.

Used by coppersmiths and other metal workers.

Length, In. Large End	Length, In. Small End	Diam. Small End, In. Wide Point	Diam. Small End, In. Narrow Point	Diam. Large End, In. Wide Point	Diam. Large End, In. Narrow Point	Wt. Lbs.	Price Each
9	**18**	1½	⅜	4¾	½	14	**$13.00**

Pexto Solid Mandrel Stakes



Cast iron with polished face.

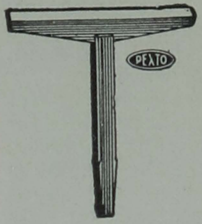
Stakes are made of cast iron and are made as well as it is possible to make a stake of cast iron.

Cast iron stakes cannot be guaranteed against breakage through misuse.

Breakage through perceptible flaws in material will be adjusted.

No.	Length Inches	Diameter Inches	Weight Pounds	Price Each
960½	40	3	86	**$12.00**
961	34½	2¾	56	**10.00**
962	30	2¼	43	**8.00**

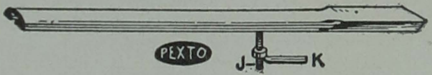
Pexto Hatchet Stakes



Made of high carbon steel; with faces hardened and tempered.

No.	Each	Length Blade In.	Width Blade, In. At Center	Width Blade, In. At Ends	Weight Pounds
941	**$18.00**	16	2½	1⅝	14
943	**14.00**	13	2⅛	1¼	9½
944	**12.00**	11	2⅛	1⅜	6½

Pexto Hollow Mandrel Stakes



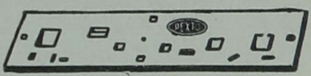
Cast iron, with polished face.

Stake is made of cast iron, and though made as well as is possible to make a stake of cast iron, it cannot be guaranteed against breakage through misuse.

Breakage through perceptible flaws in the material will be adjusted. Working surface is machined finish with true radius and straight edges.

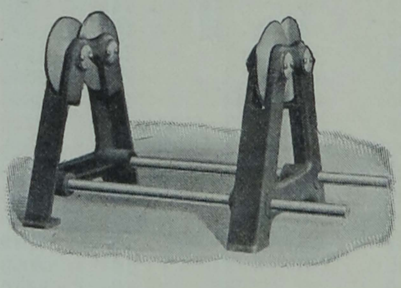
No	910	911
Each	**$18.00**	**36.00**
Over-All Length inches	40	60
Flat Part, Length inches	9	12
Oval Part, Length inches	31	48
Flat Part, Width inches	6	7
Oval Part, Radius inches	2	2½
Weight pounds	60	110

Pexto Cast Iron Bench Plates



No.	Length Inches	Width Inches	Weight Pounds	Price Each
980	48	12	85	**$24.00**
981	37½	8	46	**16.50**
982	30	8	31	**12.00**

Anderson Improved Balancing Ways

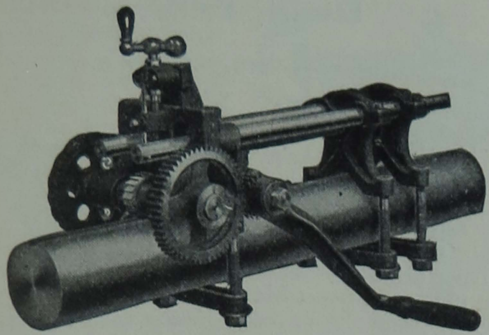


Made in 6 sizes, to balance anything that revolves, from a crank shaft to a turbine rotar. Requires no special leveling, no adjustment and no centers.

Equipped with glass-hard spindles, chilled steel discs and especially sensitive ball bearings.

Diameter Work...in.	**20**	**40**	**60**	**72**	**96**
Each	**$35.00**	**40.00**	**50.00**	**175.00**	**250.00**
Greatest Distance between Standards....in.	20	30	30	66	88
Capacity........lbs.	1000	2000	2000	5000	10000
Shipping Weight lbs.	45	90	150	350	650

Burr Portable Shaft Keyseaters



No. 1

This machine will mill keyseats in the middle or on the ends of shafting without removing it from its hangers or boxes. It will mill keyseats up to 12 inches long at each setting and as there is a sliding support under the cutters at all times it cuts without chatter or jar and produces keyseats with straight sides and smooth bottoms.

It is provided with automatic feed while cutting which may be disengaged if desired and the cutter-head fed by hand feed. The cutter-slide is provided with an adjustable depth gauge showing the depth being milled.

A set of milling cutters which used singly or combined will mill all widths from ¼ inch to widest of machine's capacity, is furnished as well as all necessary operating equipment.

Can be furnished motor-driven. Price on application.

Machine No.	Largest Shaft Cap. In.	Will Mill at Each Setting In.	No. of Cranks	No. Cutters in Set	Will Mill All Widths In.	Wt., Lbs. Net	Wt., Lbs. Gross	Price Each
1	5	12	1	5	¼–1⅛	80	105	**$85.00**
1-A	6	12	2	5	¼–1⅛	90	115	**95.00**
2	8	12	2	6	¼–1½	200	250	**135.00**
3	12	12	2	7	¼–2½	325	390	**200.00**

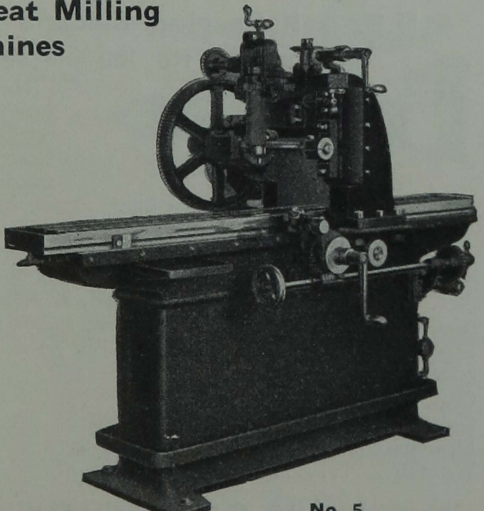
Burr Keyseat Milling Machines

Automatic, adjustable trip. Eight changes of feed. Spindle of crucible steel.

All gears covered. Oil pump, piping and flexible tube.

Router spindle has independent vertical adjustment.

Furnished either with or without routing attachment.

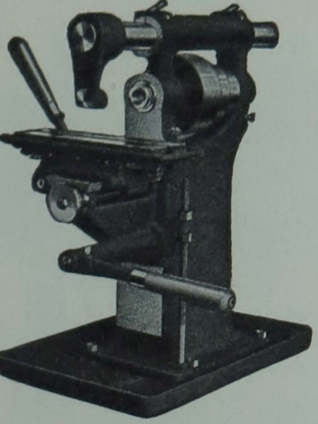


No. 5

No.	3	5	6	7
Width of Platen . in.	6¾	9	11	12
Length " " . "	36, 48, 60	48, 60, 72	48, 60, 72	72, 84, 96
Diam. of Spindle, in.	2¼	3	3	3
Max. Distance Center of Spindle to Platen........in.	8½	11½	11½	15
Min. Distance Spindle to Platen . . in.	1¾	1⅛	1⅛	0
Takes through Housing . . "	9x7⅜	10⅜x9⅜	13½x9⅜	14x11
Diameter Main Driving Gear . . in.	15	20	20	24
Face Main Driving Gear.........in.	2	2½	2½	2¾
Driving Pulley . . "	12x3¼	14x4¼	14x4¼	16x4¼
Weight 60-in. Complete Mach. . . lbs.	2300	3000	3500	6500

Prices upon application.

Burke Milling Machines



No. 3

Built of seasoned castings.

Spindles are made of high carbon steel, ground and running in heavy special bronze bearings.

Front bearings are tapered, rear bearings are straight.

Arrangements made for accurate adjustment.

Spindles and cones are balanced to run at high speeds.

Large oil cellars under each of the spindle bearings assure an adequate supply of oil at all times.

Knee, which is of solid top construction and rigid, can be locked in any position.

All bearing surfaces scraped to perfect alignment.

Nos. 0, 1, 3 and 5 machines are equipped with hand feed, both horizontal and vertical.

Nos. 2 and 4 machines are equipped with power horizontal feed. The drive is through a worm and bronze worm gear.

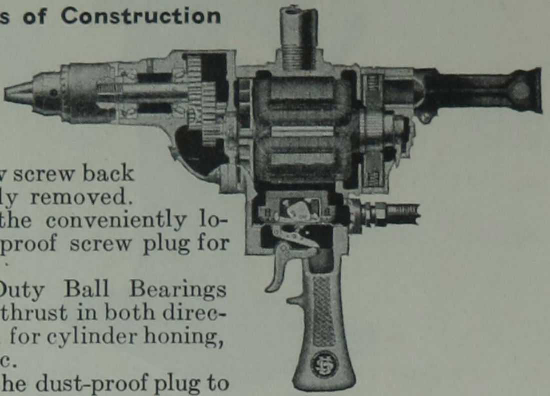
No.	**0**	**1**	**2**
Longitudinal Feed.........inches	4½	8	8
" " with One Setting of Lever...........inches	4½	5	...
Traverse Feed............ "	1½	3⅜	3
Vertical " .... "	3¼	4½	6¼
Maximum Distance between Center of Spindle and Table . inches	4¼	5¼	6¼
Working Surface of Table . . "	3x9	3½x12	3½x16
Greatest Distance between Centers.... "	...	3¾	7½
Largest Diameter of Cone. "	4¼	6	6
Smallest " " " . . "	2¼	3½	3½
Width of Driving Belt..... "	1¼	2	2
B. & S. Taper Hole..........No.	7	9	9
Hole of Spindle...........inches	9/16	9/16	9/16
Height Over All.......... "	15½	21	22
Size of Loose Pulley on Countershaft... "	7x2¼	7x2¼	7x2¼
Speed of Countershaft.....r.p.m.	280	280	280
Shipping Weight........pounds	160	250	290

No.	**3**	**4**	**5**
Longitudinal Feed........inches	8	8	12
" " with One Setting of Lever...........inches	5	...	5½
Traverse Feed............ "	3⅜	3	4½
Vertical " .... "	7½	8	7
Maximum Distance between Center of Spindle and Table . inches	7½	8	8½
Working Surface of Table . . "	3½x12	3½x16	5x16
Greatest Distance between Centers... "	3¾	7½	5¼
Largest Diameter of Cone. . "	6	6	9⅜
Smallest " " " . . "	3½	3½	5⅝
Width of Driving Belt..... "	2	2	2½
B. & S. Taper Hole..........No.	9	9	9
Hole of Spindle...........inches	9/16	9/16	9/16
Height Over All.......... "	25½	25½	54
Size of Loose Pulley on Countershaft. . "	7x2¼	7x2¼	10x3
Speed of Countershaft.....r.p.m.	280	280	200
Shipping Weight.........pounds	300	350	1300

Prices upon application.

U. S. Electric Drills

Details of Construction



Three-jaw screw back chuck, easily removed.

Remove the conveniently located dust-proof screw plug for oiling.

Heavy Duty Ball Bearings provide for thrust in both directions. Ideal for cylinder honing, reaming, etc.

Remove the dust-proof plug to refill gear case with grease.

Chrome nickel alloy steel gears hardened, run in grease.

Generous grease compartment. Generous oil reservoir.

Armature mounted on ball bearings.

Air outlet. Air intake.

Special design fan insures generous supply of cool air.

Anchor screws, in addition to ribs, hold motor in place.

Powerful Universal motor.

Switch operating trigger conveniently located in handle.

Quick make and quick break double pole switch. When switch is in off position motor is free from current.

Generous ducts provide ample circulation of air.

Special U. S. cable retainer and protector prevents strain on switch connections. Cable protector spring does not permit short kink bends in cable.

Brushes easily replaced by unscrewing slotted nut.

Screws hold brush holders in place.

Detachable combination breast plate and spade handle screwed on threaded steel stud.

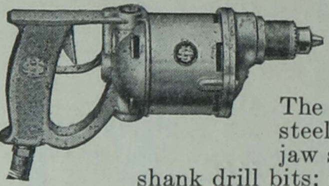
Detachable side handle permits close corner drilling.

Cylindrical frame provides maximum strength.

Spindle offset for close corner drilling.

U. S. Portable Electric Drills

32, 110 or 220 Volts, D.C. or A.C.



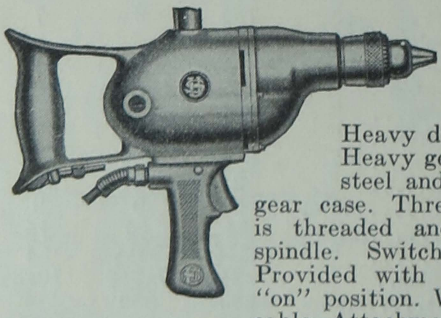
This drill is light in weight with double lubricating system—oil and grease. Equipped with Universal motor. The gears are chrome nickel steel, hardened, run in grease; 3-jaw screw back chuck for straight shank drill bits; quick make, quick break trigger switch; aluminum body. Has ball bearings throughout. Furnished with 15 feet flexible rubber covered cable and attachment plug.

Keyless chuck furnished without additional charge if so ordered.

Size, Inches	Each	Cap. in Steel, In.	Full Load R.P.M.	Weight Pounds
¼ Midget (110 Volt Only)	$32.00	¼	2000	3½
¼ Regular	30.00	¼	2000	5¾
¼ Heavy Duty	40.00	¼	2000	7

U.S. ½-Inch Commander Electric Drills

For 32, 110, 220 or 250 Volts



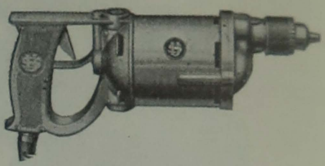
For drilling in metal or wood; can also be used for driving hole saws, wood augers, etc. Heavy duty universal motor. Heavy gears of chrome nickel steel and run in grease tight gear case. Three-jaw geared chuck is threaded and screws on chuck spindle. Switch is of 2-pole type. Provided with lock for holding in "on" position. With 15 feet of 3-wire cable. Attachment plug is of rubber. Load speed, 450 r.p.m.; length over all, 16 inches.

Shipping weight, 13 pounds.

Each.. **$34.50**

U. S. 5/16-Inch Heavy Duty Portable Electric Drills

110, 220 or 32 Volts, D.C. or A.C.

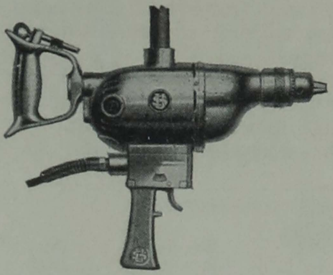


Has Universal motor; ball bearings on armature and on chuck spindle; 3-jaw screw back chuck; chrome nickel steel gears, hardened, run in grease; 15 feet flexible rubber covered cable with armored attachment plug. Operates on d.c. or a.c. (60 cycles or less) circuits with voltage 10 per cent higher or lower than marked on name plate. Capacity in metal, 5/16 inch; in hardwood, 7/16 inch. Speed under load, 1000 r.p.m. Dimensions, 3⅞x10 inches. Net weight, 7¼ lbs.

5/16-inch Heavy Duty, All Voltages............each **$45.00**

U. S. Electric Drills

32, 110 or 220 Volts A.C. or D.C.

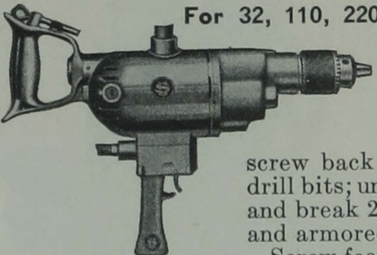


Universal motor; chrome nickel steel gears, hardened, run in grease; quick make, quick break switch; 3-jaw screw back chuck for straight shank drill bits; aluminum body; ball bearings; combination breastplate and spade handle; 2 side handles, 1 removable; 15 feet flexible rubber covered cable and attachment plug.

Size Inches	Each	Speed Full Load R.P.M.	Capacity, Inches Metal	Capacity, Inches Hardwood	Dimensions Inches	Weight Pounds
⅜ Heavy Duty	**$50.00**	750	⅜	9/16	4½x16	13
½ Special	**53.00**	450	½	¾	4½x16½	14½

U.S. Ball Bearing Electric Drills

For 32, 110, 220 and 250 Volts



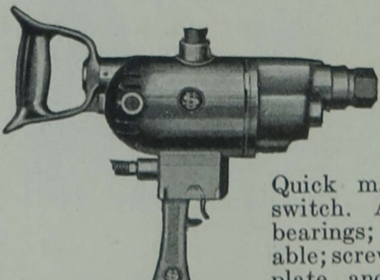
Has aluminum body; 2 side handles, one removable; combination breast plate and spade handle; 3-jaw screw back chuck for straight shank drill bits; universal motor; quick make and break 2-pole switch; 15-foot cable and armored attachment plug.

Screw feed, $2.50 extra.

Size............in.	½ H.D.	⅝ Std.	⅝ H.D.	¾ H.D.
Each............	**$65.00**	**68.00**	**75.00**	**85.00**
Speed under Load.....r.p.m.	450	400	400	350
Cap. in Metal......in.	½	⅝	⅝	¾
Cap. in Wood......in.	¾	⅞	⅞	1
Dimensions........in.	5x18	5x18	5x19	5x24
Weight..........lbs.	16½	17	23½	25½

U. S. Electric Drills

32, 110, 220 or 250 Volts A.C. or D.C.



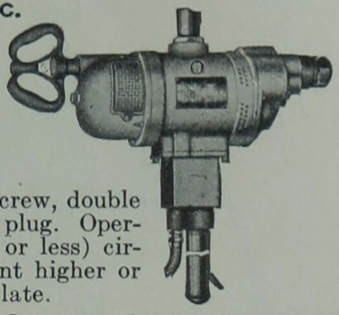
Universal motor with chrome nickel steel gears, hardened, run in grease. No. 3 Morse taper, with drift key, for taper shank drill bits from 37/64 to ⅞-inch. Quick make, quick break 2-pole switch. Aluminum body with ball bearings; 2 side handles, 1 removable; screw feed; combination breastplate and spade handle; 15 feet flexible rubber covered cable and attachment plug.

Size ⅞ H.D.; dimensions 5x22 inches. Capacity in metal ⅞ inch, in hardwood, 1½ inches. Speed, with full load, 280 r.p.m. Weight 24 pounds.

Each.. **$96.00**

U. S. Portable Electric Drills

110, 220 and 250 Volts, D.C or A.C.

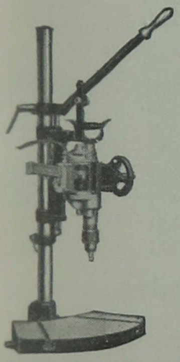


Universal motor; chrome nickel steel gears, hardened, run in grease; 1-inch drill has No. 3 Morse taper; 1¼ and 1½-inch, No. 4 Morse taper; 2-inch, No. 5 Morse Taper. Automatic self-releasing 4-pole switch. Feed screw, double grip handle, 15 feet cable and plug. Operate on d.c. or a.c. (60 cycles or less) circuits with voltage 10 per cent higher or lower than marked on name plate.

Size Inches	Each	Capacity, In. Metal	Capacity, In. Wood	Capacity, In. Reaming	Speed R.P.M.	Dimen. In.	Wt. Lbs.
1	$98.00	1	1¾	¾	200	6x17	48
1¼	150.00	1¼	2¼	15/16	180	7x18	70
1½	175.00	1½	2½	1	105	7x19	73
2	225.00	2	4	1¼	80	9x21	85

U. S. Heavy Duty Post and Bench Drill Stands

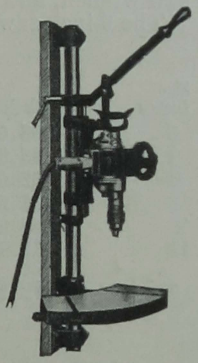
No. 1B, for ⅜-Inch H.D. and ½-Inch Special Drills
No. 1½, for ½-Inch H.D.; ⅝, ¾-Inch H.D., ⅞ and 1-Inch H.D. Drills
No. 1½A, for 1¼, 1½ and 2-Inch Drills



Bench Drill Stand

The bracket carrying the drill is designed to eliminate the use of adapters. It is raised or swung around on the vertical column and secured in any desired position by means of a split collar and clamping screw.

The drill is supported by an inclosed spring.



Post Drill Stand

Bench Stands

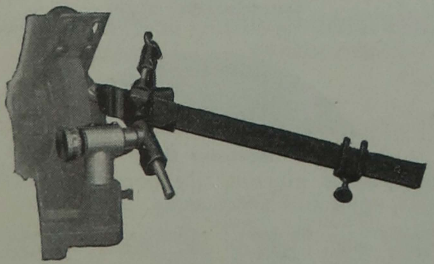
No.	Each	Dimensions, Inches: Column Ht.	Size Base	Distance Column to Center Drill Bit	Distance Base to Drill Chuck	Feed Travel	Column Diam.	Net Wt., Lbs.
1B	$22.00	28	9x 9	6½	14	4	1½	55
1½	28.00	34	16x10	6½	19	5	1⅞	98
1½A	50.00	41	18x10	6¼	17	6	1⅞	110

Post Stands

1B	$28.00	46	9x 9	6½	32	4	1½	98
1½	32.00	58	16x10	6½	43	5	1⅞	147
1½A	54.00	60	18x10	6¼	32	6	1⅞	155

U. S. Twist Drill Grinding Attachments

For 6, 7, 8, 10 and 12-inch Grinders

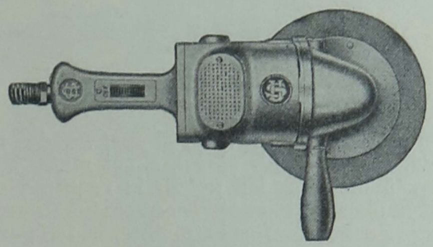


For grinding straight and taper shank drill bits. Has micrometer screw feed to advance twist drill against wheel. Will grind drills ¼ to 1¼ in. Adjustment provided for different diameter drills. Cup wheel recommended when using this attachment on 6 and 7-inch grinders.

Each.................................... **$15.00**

U. S. Portable Electric Polishers

Air Conditioned



Has air cleaner, which prevents dust and dirt from entering motor; dust proof switch.

Polisher has ample power, but is light in weight, permitting the operator to cover the surface of the car very rapidly.

Speed, 1200 r.p.m. under load. This speed will not burn the work, and is recommended by polish manufacturers.

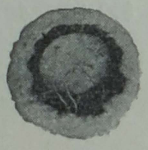
The armature is supported by heavy duty ball bearings, and the ⅝-inch spindle has a heavy ball thrust bearing. The switch is conveniently located in the handle. The side handle is interchangeable, permitting the operator to use it on either the right or left side.

Universal motor operates on d.c. or a.c. of 60 cycles or less. Furnished for 32, 110, 220 or 250 volts.

Complete with 2 lamb's wool bonnets and 1 felt rubbing pad.

Size.....inches	7	9
Each.....	**$49.50**	**65.00**
Weight.....pounds	8	12

Lamb's Wool Polishing Bonnets

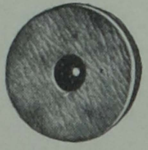


For cleaning, polishing and waxing Duco and lacquer finishes, also for obtaining high luster after spraying.

Attached to flexible pad of polisher. Held in place by draw string.

Size.....inches	7	9
Each.....	**$2.00**	**$2.50**
Per Package of 6.....	**10.00**	**13.00**

Felt Rubbing Pads

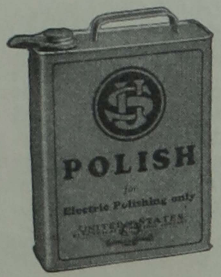


For rubbing down Duco or lacquer finishes, etc.

Attached direct to flexible pad of polisher.

Size.....inches	7	9
Each.....	**$1.50**	**$2.00**
Per Package of 6.....	**7.50**	**10.00**

Super Polish

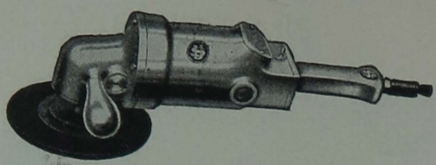


Made especially for use with the U.S. Polisher.

Cleans and polishes in one operation with surprising results.

Per Gallon.....	**$4.00**
Shipment of 6.....per gallon	**3.50**

U. S. Air Conditioned Sanders



An indispensable tool for body shops, woodworking plants of all kinds, fender repair shops, sheet metal shops. Ideal for use any place where a polish is required on wood or metal, and in places where it is convenient to use a portable tool on large surfaces. Disc is flexible, which permits covering a surface without danger of gouging.

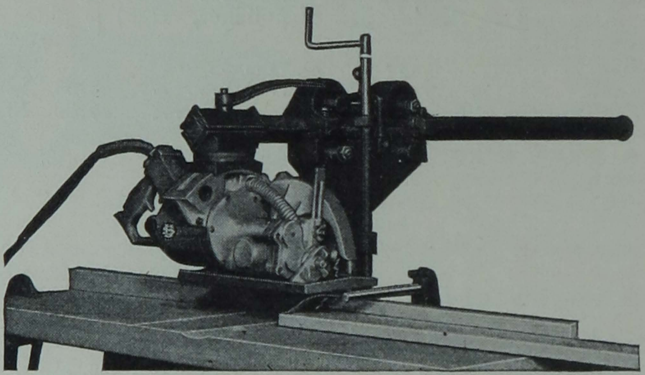
For smoothing down rough spots and removing corrosion from automobile bodies before repainting; in fender repair shops for finishing the damaged part after it has been straightened. A much needed unit in the boat building industry for sanding operations prior to painting or refinishing. Touching up rough spots, smoothing castings, cleaning concrete mixers and forms, sanding jobs required by the cabinet maker and carpenter are all practical and economical uses for the portable electric disc sander.

Has air cleaner, air outlets to blow dirt away from operator, dust proof switch, dust seal ball bearings. Also equipped with flexible disc pad, 1 each Nos. 16, 36 and 50 grit abrasive discs; 15 feet of 3-wire flexible rubber covered cable with attachment plug. Reversible side handle can be used on either side of tool.

Universal motor operates on a.c. or d.c. of the same voltage, 60 cycles or less, standard voltage 110; also available in 32, 220 or 250 volts. Spindle diameter on all machines, ⅝ inch—16 thread.

Size..............in.	7	7	7	9
Each................	**$39.50**	**48.00**	**68.00**	**70.00**
Type................	Utility	Std. Duty	Hvy. Duty	Std. Duty
No Load Speed.r.p.m.	4200	4200	4200	3800
Load Speed....r.p.m.	2200	3200	3800	2700
Lgth. Over All....in.	14	14½	15½	15½
Ship. Wt..........lbs.	12	17	18	19

U. S. Radial Arms



Fits all new type U.S. saws except the 6 and 7-inch sizes. May be carried from job to job in an automobile. Arm runs between 4 V-type rollers mounted on 8 ball bearings. Rollers and bearings are packed in grease and enclosed in air-tight housing, protected from grit or dust. Duraluminum bracket weighing approximately 1 pound made to fit screw holes in saw, eliminating drilling or fitting. Once the bracket is attached to saw, it is not necessary to remove bracket. A few turns of the handle releases or fastens it to the arm.

If the arm is equipped with a portable saw, it makes dadoing, dovetailing, mortising, and compound angle cuts as easy as cross-cutting. Radial arm gives more power and longer life to an electric hand saw, as blade is held rigid and there is no side friction on blades to pull down power, causing wear and tear on the saw.

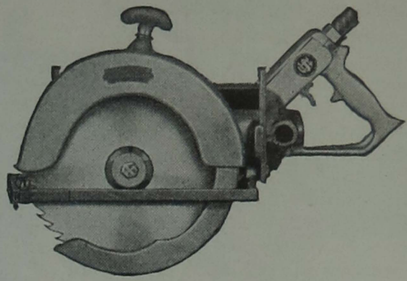
No wrenches are needed. All adjustments may be made by thumb nut.

Furnished without portable electric saw.

Approximate weight each, 85 pounds.

Each.. **$78.00**

U.S. Portable Ball-Bearing Electric Saws



These saws are light in weight, yet their sturdy construction will withstand the most severe usage.

Saws are instantly set to any angle from 0° to 60° and to any depth from 0 to full capacity.

A new type depth gauge operates straight up and down; instantly set.

Universal motor, d.c. or a.c., 60 cycles or less, 110, 220 or 250 volts. Special voltages or windings to order. Ample power to cut wet wood or hard materials.

All saws are equipped with momentary contact switch which opens circuit and stops motor when finger is removed from trigger.

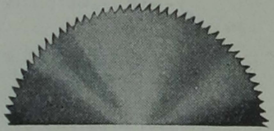
Furnished with 3-wire rubber-covered cable (one wire for grounding) and attachment plug.

Equipped with metal carrying case, combination blade, saw wrench, and grease gun filled with grease.

The 6-inch saw has a tilting base—0° to 45°.

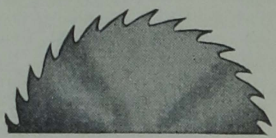
Size Inches	Each	Depth Capacity Inches	Speed R.P.M.	Weight Pounds
6	**$65.00**	1⅞	3750	10½
7	**95.00**	2⅛	4000	20
8	**123.00**	2½	5000	26¼
9	**132.00**	3	4400	26½
10	**140.00**	3½	4200	29¼
11	**154.00**	4	4000	30¼

U. S. Circular Saw Blades



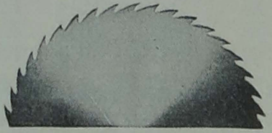
Cross-Cut Blade

For fast, smooth cross-cutting in wood.



Rip Saw Blade

A fast blade designed for ripping in all kinds of wood.



Combination Blade

For ripping and cross-cutting in all kinds of wood.

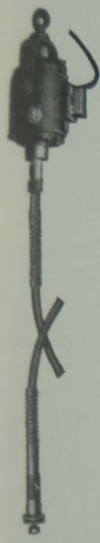
Abrasive Disc

For cutting slate, marble, tile, porcelain, vitritile, transite, asbestos, steel and soft metals.

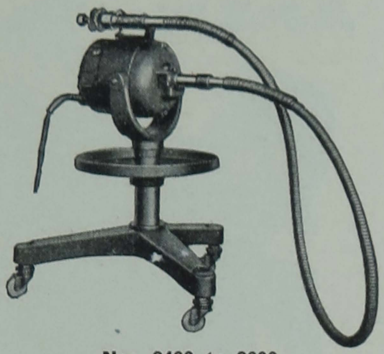
Diameter Inches	Cross-Cut Each	Rip Saw Each	Combination Each	Abrasive Disc Each	Sq. Hole Inches
6	**$4.50**	**$4.50**	**$4.50**	**$2.00**	¾
7	**5.00**	**5.00**	**5.00**	**2.50**	1
8	**5.50**	**5.50**	**5.50**	**2.75**	1
9	**6.50**	**6.50**	**6.50**	**3.50**	1
10	**7.50**	**7.50**	**7.50**	**4.75**	1
11	**8.00**	**8.00**	**8.00**	**5.50**	1

U. S. Flexible Shaft Machines

All Ball-Bearing



Nos. 8100 to 8300



Nos. 8400 to 8600

These machines are furnished in 2 types: Overhead mounting, Nos. 8100 to 8300; floor mounting, Nos. 8400 to 8600.

All motors are ball-bearing 40 degree ratings, will stand a momentary overload of more than 100%. Alternating current single-phase motors are repulsion induction type.

Furnished for 110, 220 volts; 25 to 60 cycle; 1, 2 or 3-phase, A.C.; 110, 220 volts, D.C. For other than 50 or 60-cycle, increase price 10%. Overhead trolley can be furnished. Add $5.00 to price of vertical machine.

When ordering for a.c., specify voltage, cycles and phase; for d.c., voltage only. Prices are for complete machine as shown, including ball-bearing hand piece.

NOTE.—The Power transmitted by a flexible shaft is governed by the diameter of the core and the speed at which it is operated. The shafts of machines 1½-h.p. and smaller are for motor speeds of 3600 r.p.m. 1800-speed motors can be furnished with the proper size shaft at no additional charge.

For Vertical Mounting

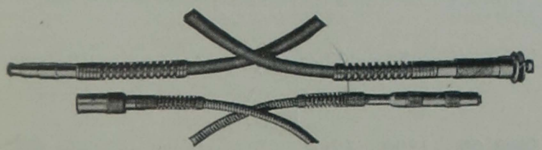
Type No.	A.C. Each	D.C. Each	H.P.	Shaft No.	Length Shaft Ft.	Core Diam. In.	*Grind Wheel Cap. Recommended Inches	Ship. Wt. Lbs.
8100	$90.00	$90.00	¼	10	5½	7/16	4x⅜x½	90
8150	137.00	137.00	½	12	5½	½	6x1x⅝	140
8200	185.00	185.00	1	15	6½	⅝	7x1x⅝	175
8250	210.00	250.00	1½	18	7	¾	7x1¼x⅞	205
8300	235.00	275.00	2	20	7	⅞	10x1½x⅞	225

For Floor Mounting

Type No.	A.C. Each	D.C. Each	H.P.	Shaft No.	Length Shaft Ft.	Core Diam. In.	*Grind Wheel Cap. Recommended Inches	Ship. Wt. Lbs.
8400	100.00	100.00	¼	10	5½	7/16	4x⅜x½	120
8450	148.00	148.00	½	12	5½	½	6x1x⅝	175
8500	192.00	192.00	1	15	6½	⅝	7x1x⅝	205
8550	225.00	265.00	1½	18	7	¾	7x1¼x⅞	235
8600	250.00	290.00	2	20	7	⅞	10x1½x⅞	255

*Wire and buffing wheels should be 1-inch diameter smaller than grinding wheel recommended.

U.S. Flexible Shafts and Parts

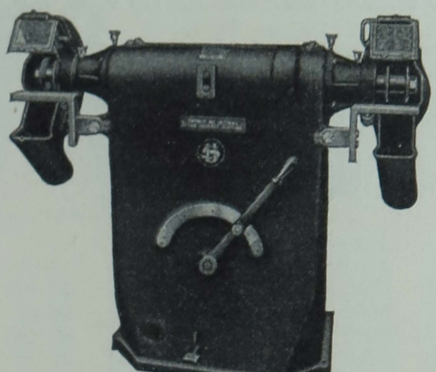


Has spiral end pieces. Cores are of music wire. Hand pieces are all ball bearing.

No.	Shaft Each	Core Each	Casing Each	Hand Piece Each	Hand Piece Model	Type Tool Holder	Diam. between Flanges In.	Lgth. Over All Ft.	Diam. Core In.
6	$23.50	$4.25	$8.25	$11.00	A	Collet Chuck	..	3¾	¼
9	30.75	8.25	10.75	11.75	A	Collet Chuck	..	5	⅜
10	35.75	9.40	12.60	13.75	B	Flange Spindle	½	5½	7/16
12	49.00	15.05	17.45	16.50	B	Flange Spindle	⅝	5½	½
15	71.50	24.25	26.75	20.50	B	Flange Spindle	⅝	6½	⅝
18	80.50	29.25	30.75	20.50	B	Flange Spindle	¾	7	¾
20	106.00	38.00	42.00	26.00	B	Flange Spindle	⅞	7	⅞

Model 64 U.S. Adjustable Speed Ball-Bearing Grinders

For 220, 440 or 550 Volts, 25, 30, 40, 50 and 60 Cycles, 2 or 3-Phase A.C.



This grinder is designed for heavy duty continuous service. Motor is built to N.E.M.A. standard; runs on ball bearings, with a temperature rise of 40 degrees.

The conveniently located push button control carries low voltage release and overload protection.

The chrome-manganese motor shaft and wheel spindle run on ball bearings and are mounted in dust-proof housings with inner and outer labyrinth seals.

Semi-steel guards adjustable with wheel wear and so arranged that it is impossible to overspeed wheel. Guards are moved as wheel diameter decreases. Change of speed is made at predetermined wheel diameter, thereby assuring maximum wheel and grinding efficiency.

Eye shields and adjustable tool rests are standard equipment.

Grinder is built in accordance with the Safety Code of the American Engineering Standards Committee, Bulletin No. 527 of the United States Bureau of Labor Statistics.

Specify voltage, cycle and phase when ordering.

For Vitrified Wheels

H.P.	Wheel Size In.	Spindle Speeds R.P.M.	Flg. Diam. In.	Shaft at Bearing, In.	Diam. Between Flgs. In.	*Lgth. Spindle Over All In.	Height Floor to Center Spindle In.	Size Base at Bottom In.	Ship. Wt. Lbs.	Each
3	12x2	1750–1900 2100–2600	6	1.574	1¼	54	39	21x31	1350	$485.00
5	14x3	1550–1750 2100–2600	6	1.574	1¼	56	39	21x31	1440	525.00
7½	18x2	1200–1400 1550–1750	8	1.968	1½	62	39	27x37	2470	590.00
7½	20x2	1100–1250 1500–1750	8	1.968	1½	62	39	27x37	2570	655.00

For High Speed Wheels

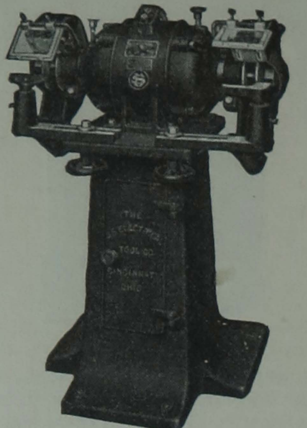
H.P.	Wheel Size In.	Spindle Speeds R.P.M.	Flg. Diam. In.	Shaft at Bearing In.	Diam. Between Flgs. In.	Bore In.	*Lgth. Spindle Over All In.	Ht. Floor to Center Spindle In.	Size Base at Bottom In.	Ship. Wt. Lbs.	Each
3	12x2	3050–3400 3900–4500	6	1.574	1¼	1¼	54	39	21x31	1350	$535.00
5	14x3	2600–3050 3600–4400	6	1.574	1¼	1¼	56	39	21x31	1440	575.00
7½	18x2	2000–2250 2400–2550	13	1.968	1½	10	62	39	27x37	2470	640.00
7½	20x2	1800–2000 2300–2550	13	1.968	1½	10	62	39	27x37	2570	705.00

For other than 50 or 60 cycles, increase price 10 per cent.

*Using 8-inch housing.

Model 10 U. S. Light Type Ball-Bearing Grinders

110, 220, 440, 550 Volts, 1, 2 or 3-Phase, 25, 40, 50 or 60-Cycle, A.C.; 110, 220, 550 Volts, D.C.



These grinders are designed and built to withstand continuous production service. The rugged construction eliminates vibration and assures long and satisfactory service.

Motors capable of heavy duty service, built to N. E. M. A. standards, rated for continuous service at full load with temperature rise of 40°; heavy duty ball bearings, enclosed in dust-proof boxes, support the heavy 1-piece alloy steel spindle.

All grinders are equipped with remote control which assures motor protection under all conditions. Control on a.c. across the line type; d.c., accelerating type. The control is located in base of grinder and has overload cut-out and no voltage release. The push button station is on motor frame.

Wheel guards are equipped with exhaust connections, hinged doors, spark breakers and adjustable unbreakable glass eye shields. The tool rests are rigid and also adjustable. Door on heavy base is provided for control inspection.

The alloy steel spindle is provided with positive shaft locking device for holding shaft while renewing wheels.

Inner wheel flanges are keyed to the shaft.

Grinding wheels are not furnished but can be supplied on special order at an additional cost.

Size of base at bottom: 2 and 3-h.p. grinders, 19x20 inches; 5-h.p. grinders, 26x27 inches; 7½ h.p. grinders, 27x29 inches.

A. C.

H.P.	Each	Volts	Speed R.P.M. No Load	Size Wheel In.	Diam. Spindle Between Flanges In.	Length Spindle Over All In.	Ht. from Floor to Center Spindle In.	Net Wt. Lbs.
2	$250.00	220–440–550	1750	12x2	1⅛	26½	39	430
3	$284.00	220–440–550	1750	12x3	1¼	30½	39	470
5	325.00	220–440–550	1750	14x3	1¼	36¼	38	660
7½	403.00	220–440–550	1120	16x2	1½	39	36	1130
7½	425.00	220–440–550	1120	18x3	1½	41	36	1160
7½	445.00	220–440–550	1120	20x3	1½	41	36	1200

For 2-phase use the same price and dimensions as standard 3-phase.

For other than 50 or 60-cycle, increase price 10 per cent.

For single-phase of 2-h.p. and larger, increase price of A.C., 25 per cent.

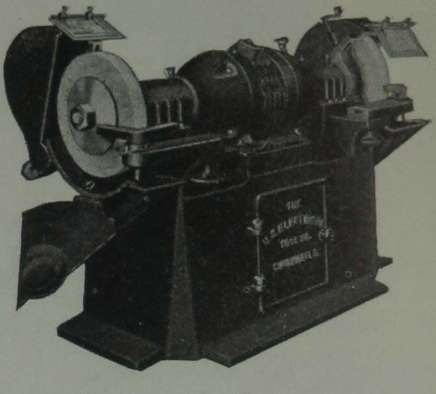
D.C.

H.P.	Each	Volts	Speed R.P.M. No Load	Size Wheel Inches	Diam. Spindle Between Flanges In.	Length Spindle Over All In.	Ht. from Floor to Center Spindle In.	Net Wt. Lbs.
2	$280.00	110, 220	1800	12x2	1⅛	26½	39	410
3	350.00	110, 220	1800	12x3	1¼	35¾	39	980
5	398.00	110, 220	1800	14x3	1¼	37¾	39	990
7½	525.00	110, 220	1100	16x2	1½	43½	39	1440
7½	550.00	110, 220	1100	18x3	1½	45½	39	1450
7½	575.00	110, 220	1100	20x3	1½	45½	39	1500

600-volt can be furnished at additional cost of 10 per cent to price.

Model 40 U.S. Heavy Duty Ball-Bearing Grinders

220, 440, 550 Volts, 2 or 3-Phase, 25, 40, 50 and 60 Cycles, A.C.—110, 220, 550 Volts D.C.



The motors are capable of heavy duty service. Built to N.E.M.A. standards, and are rated for continuous service at full load with a temperature rise of 40 degrees. Four heavy duty S.K.F. ball bearings (enclosed in dust-proof boxes) support the heavy one-piece shaft.

All grinders are equipped with remote control which assures motor protection under all conditions. Control on a.c. across-the-line type, d.c. accelerating type. The control is located in base of grinder and has overload protection and no voltage release. The push button station is on motor frame.

The wheel guards are hinged door type, adjustable to wheel wear. The exhaust connections are stationary irrespective of the adjustment to wear of wheel. Adjustable tool rests and eye shields are standard equipment. Door in base is provided for control inspection. Straight flanges are standard equipment. The high-grade chrome-manganese alloy steel spindle is provided with positive shaft locking device for holding shaft while renewing wheels. Inner wheel flange is keyed to the shaft. Grinding wheels are not furnished but can be supplied on special order at an additional charge.

For boiler plate guards on either a.c. or d.c. machines, add 15 per cent to a.c. prices.

A.C.

H.P.	Each	Speed R.P.M.	Wheel In.	Diam. Spindle Bet. Flanges In.	Length Spindle Over All In.	Base at Bottom Inches	*Ht. In.	Ship. Wt. Lbs.
7½	$630.00	1120	18x3	2	66½	53x26	33	1955
7½	655.00	1120	20x3	2	66½	53x26	33	2000
10	831.00	850	24x4	2¼	68¾	53x26	33	2160
15	969.00	850	24x4¾	2½	70½	53x26	33	2520
20	1305.00	680	30x5	3	76½	53x26	33	3550

Any standard speed can be furnished.

The 2-phase machines have same dimensions and price as 3-phase.

For other than 50 or 60-cycle, increase price 10 per cent.

D.C.

7½	$800.00	1100	18x3	2	66½	53x26	33	2735
7½	831.00	1100	20x3	2	66½	53x26	33	2800
10	960.00	850	24x4	2¼	68¾	53x26	36	2940
15	1140.00	850	24x4¾	2½	70½	53x26	36	3100
20	1448.00	675	30x5	3	76½	53x26	36	3770

Any standard speed can be furnished.

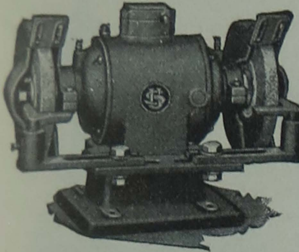
For 600 d.c. volts, increase price 10 per cent.

Above d.c. grinders are equipped with Field Protective Relay which assures safety in the event of a field failure.

*From floor to center of spindle.

U. S. Heavy Duty Grinders

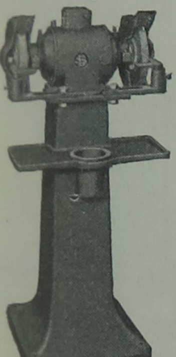
Bench Grinders



This grinder is completely equipped with adjustable tool rests, enclosed wheel guards, 2 wheels, 1 coarse and 1 fine, cable, attachment plug, switch, etc. Motor, 40°; ball bearing. Spark breakers. Grinder is not furnished with universal motors. In ordering specify whether for d.c. or a.c.; specify voltage for d.c. and for a.c. voltage, cycle and phase.

	8	10x1	10x1¼
Size Grinder..........inches	**8**	**10x1**	**10x1¼**
For A.C..................each	**$85.00**	**$115.00**	**$125.00**
For D.C..................each	**90.00**	**118.00**	**145.00**
Motor.....................h.p.	½	1	1
Size Wheels...........inches	8x1x⅝	10x1x⅞	10x1¼x⅞
Height Base...........inches	5	5	5
Load Speed............r.p.m.	3450	1750	1750
Dimensions............inches	21½x12	19½x14	23¼x14
New Weight..........pounds	115	180	190

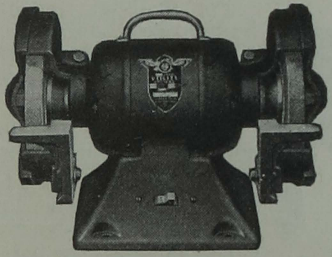
Pedestal Grinders



This grinder is the same as the Bench Type Grinder. In ordering specify whether for d.c. or a.c., specify voltage for d.c. and for a.c. voltage, cycle and phase.

Size Grinder In.	8	10x1	10x1¼
A. C. . each	**$105.00**	**$140.00**	**$155.00**
D. C. . each	**110.00**	**143.00**	**175.00**
Motor. . .h. p.	½	1	1
Size of Wheel . . inches	8x1x⅝	10x1x⅞	10x1¼x⅞
Full Load Speed . . . r.p.m	3450	1750	1750
Over all Dimensions. . . in.	21½x12x41	19½x14x42	23¼x14x42
Net Wt. . . lbs.	225	260	270

U. S. Utility Ball Bearing Bench and Floor Grinders



Adapted for grinding all kinds of edge tools and general purpose grinding within its rated capacity.

Motor.—Ball bearing, totally enclosed, dustproof. Switch-toggle in base. Centrifugal starting switch on 6, 7 and 8-inch sizes. Repulsion-induction motor in 10-inch.

Equipment — One medium and one fine grinding wheel. Three conductor cable and rubber attachment plug furnished on all single phase and d.c. grinders; 2 and 3-phase grinders arranged with leads for conduit connection. Adjustable work rests and spark breakers.

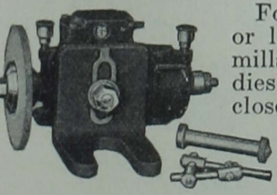
Furnished for 110, 220-volt, d.c., 110, 220, 440-volt, 25 to 60-cycle, 1, 2 or 3-phase, a.c.

Bench Type

Size Inches	A.C. Each	D.C. Each	H.P.	Size Wheels Inches	Load Speed R.P.M.	Dimensions Inches	Net Weight Pounds
6	**$23.00**	**$40.00**	¼	6x½x½	3450	14x 8x 8½	36
7	**38.00**	**42.00**	⅜	7x¾x⅝	3450	15x10x10	46
8	**58.00**	**60.00**	⅓	8x 1x⅝	3450	19x10x11	71
10	**88.00**	**92.00**	½	10x 1x¾	1750	24x13x16	142
Floor Type							
6	**$38.00**	**$55.00**	¼	6x½x½	3450	14x 8x40½	111
7	**53.00**	**57.00**	⅜	7x¾x⅝	3450	15x10x42	121
8	**73.00**	**75.00**	⅓	8x 1x⅝	3450	19x10x43	146
10	**114.00**	**118.00**	½	10x 1x¾	1750	24x13x46	242

U. S. Angle Plate Grinders

Type HB and HBB, D.C.; Type HBA and HBBA, A.C., 60 Cycles

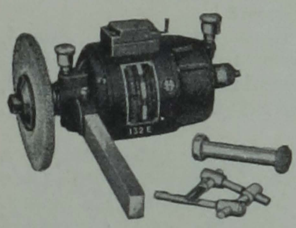


For use on shapers, lathes, 14-inch or larger swing, planers and boring mills. For grinding centers, reamers, dies and rolls. Motor entirely enclosed 40°. Index, for cutter grinding. Internal grinding attachment, 4 inches long. Internal wheel, 1¼x¼x¼ inch; external wheel; 2-piece rubber attachment plug; 15 feet flexible rubber covered cable.

Type	Each	Volts	H.P.	Speed R.P.M.	External Wheel, In.	Weight Pounds
HB	**$70.00**	110, 220 D.C.	¼	3600	6x⅜x½	24
HBA	**65.00**	110, 220 A.C.	¼	3450	6x⅜x½	28
HBB	**100.00**	110, 220 D.C.	½	3000	8x¾x⅝	54
HBBA	**95.00**	110, 220 A.C.	½	3450	8x¾x⅝	62

U. S. Electric Grinders

110 or 220 Volts, D.C. or A.C.



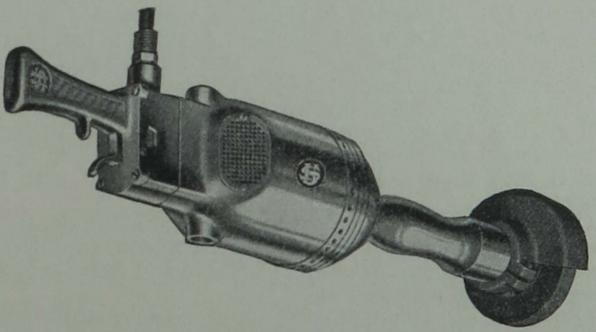
Types R and RR grinders, d.c., are made for use with lathes with compound rest, therefore have no slide. Used for grinding centers, reamers, dies and rolls. Can also be used on a shaper or planer for surface grinding.

Types RA and RRA are the same as Type R but for use on a.c.

Type................	R	RA	RR	RRA
Each................	**$65.00**	**50.00**	**90.00**	**85.00**
Size...............in.	6	6	8	8
Speed..........r.p.m.	3600	3450	3000	3450
Size Wheel........in.	6x⅜x½	6x⅜x½	8x¾x⅝	8x¾x⅝
H.P................	¼	¼	½	½
Weight...........lbs.	18	21	47	56

U. S. Portable Surface Grinders

Air Conditioned



No. OUB

For grinding, buffing, polishing, sanding down castings, dressing off gas and arc welds, removing paint from automobile bodies, springs and chassis.

Equipped with air cleaner, which prevents dust and dirt from entering motor. Dust proof switch.

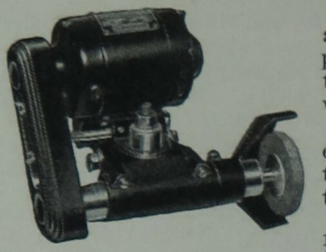
Motor is Universal and will operate on d.c. or a.c. of 60 cycles or less, 110 or 220 volts.

Light in weight and very durable.

Chrome-nickel alloy steel gears, hardened, run in grease; ball bearings throughout; switch, double pole, quick make and break, mounted in handle, aluminum body; guard; wheel; 15 feet rubber covered cable; 2-piece rubber attachment plug.

No.	Each	Size In.	Load Speed R.P.M.	H.P.	Dimen. In.	Wheel Dimen. In.	Extension In.	Wt. Lbs.
OUBB	**$45.00**	2½	8800	⅕	4 x18	2½x½x½	6	10
OUB	**60.00**	4	5000	¼	4½x19	4 x¾x½	8	11
OBU	**80.00**	5	4200	⅓	5 x25	5 x1 x⅝	12	20
OU	**100.00**	6	3600	½	6 x[illegible]0	6 x1 x⅝	12	30
OOU	**145.00**	8	3100	1	7 x30	8 x1 x⅝	12	53

No. 5 Dumore Grinders



The No. 5 Dumore Grinder is a portable tool, designed for production grinding as well as tool room and machine shop work.

Motor and quills can be turned end for end permitting the tool to be mounted on the back of the lathe.

This grinder is built around a ½ h.p. 10000 to 12000 r.p.m. universal type motor. Current consumption under load, approximately 3.5 amperes. Armature core, 2$\frac{11}{16}$x1½ inches. Adjustable type bearings with automatic adjustment. Automatic belt tension; separable tool post; from center of mounting post to center of grinding spindle, 1¾ inches. From center of spindle to base of grinder, 1 inch.

Equipment for No. 5 includes five pulleys, wheel guard, four belts, diamond dresser, steel carrying case, extension cord, feed thru switch, and attachment plug. Weight of grinder less equipment, approximately 28 pounds. Grinder with two quills, approximate shipping weight, 65 pounds.

Quill Equipment

QUILL B.—For external grinding operations. Speed, 4,000 r.p.m. to 10,000 r.p.m. Reach of spindle, 3¼ in. from inside face of wheel to frame of grinder. Diameter of quill, 1¾ in. Wheels, 2x½x⅜, 3x½x⅜, 4x½x⅜, and 5x½x⅜ in. Wheel collars, 1½ and 2 in.

QUILL V.—For small internal grinding operations to a depth of 3 inches. Reach of spindle, 4⅜ inches from inside face of wheel to frame of grinder. Diameter of quill, 1¾ inches. Wheels, ¾x½x¼, 1x¼x¼, 1¼x¼x¼, and 1½x¼x¼ inches.

QUILL V-3.—For small internal grinding operations to a depth of 3 inches. Reach of spindle, 5⅜ inches. Diameter of quill, 1¾ inches. Wheels, ¾x½x¼, 1x¼x¼, 1¼x¼x¼ inches.

QUILL V-5.—For deep internal grinding operations. Reach of spindle, 7⅜ inches. Diameter quill, 1¾ inches. Wheels, ⅞x¼x⅛, ¾x¼x⅛, ⅝x¼x⅛ inches.

QUILL D.—For the grinding of small openings, and consists of the quill equipped with chuck for mounted wheels. Approximate speed, 35,000 r.p.m. Equipment includes ⅛-inch collet and 4 mounted wheels, ¼x¼, ⅜x¼, ⅝x⅜ and 1x⅜ inch. All with ⅛x¼-inch shank.

QUILL F-6.—Designed to grind an opening 1¼ inches in diameter to a full depth of 6 inches. Adjustable ball bearings with automatic adjustment. Positive lubrication. Wheels, 1¼x½x¼x¼ (cup) and 1½x½x¼x¼ (cup).

QUILL F-10.—This is exactly the same as F-6 except that it will grind a 1¼-inch opening to a full depth of 10 inches. Construction and equipment is the same as for F-6. ¾-inch and $\frac{9}{16}$-inch wheel collars are regular equipment with both quills.

QUILL B-8.—Will grind a 2-inch hole to a full depth of 8 inches. Adjustable ball bearings with automatic adjustment. Positive lubrication. Wheels, 2½x⅜x⅜ and 2x1x⅜x⅜ (cup wheel). Wheel collars, 1 and 1½ in.

QUILL B-12.—This is exactly the same as quill B-8 except that it will grind a 2-inch hole to a full depth of 12 inches. Wheel equipment and wheel collars are the same as for B-8.

QUILL B-16.—To grind openings 2 inches in diameter to depth of 16 inches. Wheel equipment and wheel collars are the same as for B-8.

QUILL B-18.—To grind openings 2 inches in diameter to depth of 18 inches. Wheel equipment and wheel collars are the same as for B-8.

Grinders Complete with Quills

No. 5-A, Includes Quills B and V	each	$200.00
No. 5-B, Includes B Quill Only	each	155.00
No. 5-V, Includes V Quill Only	each	155.00
No. 5-V-3, Includes V-3 Quill Only	each	155.00
No. 5-D, Includes D Quill Only	each	155.00

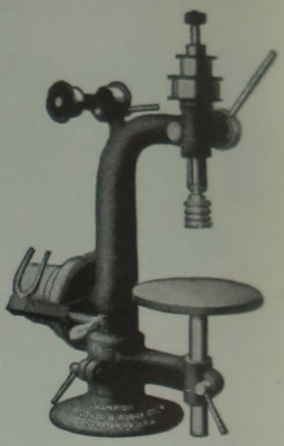
Quills Only

No.	Each	No.	Each	No.	Each
B	$45.00	V-5	$45.00	B-18	$135.00
D	45.00	B-8	75.00	F-6	75.00
V	45.00	B-12	80.00	F-10	80.00
V-3	45.00	B-16	130.00	.....	.....

No. 5356 Offset Mounting Posts

No. 5356 Offset Mounting Post	each	$7.50

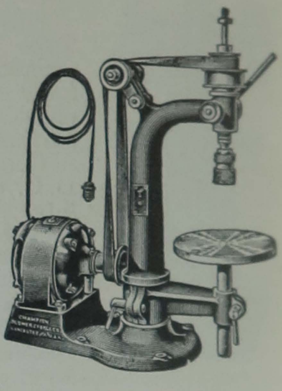
No. 50 Champion Sensitive Bench Drills



For light and rapid drilling. Made with ball bearings. Double flange top cone. End thrust ball bearing. Adjustable spindle stop. Greatest distance from spindle to table 7½ inches. Up and down movement of spindle 2½ inches, of table 5 inches. Diameter of table, 8 inches. Drills to center of 10-inch circle. Capacity, ½ inch. Speed, 550 r. p. m. Height, 27½ inches. Weight, 75 pounds.

Price, No. **50**, Complete with Champion Chuck	each	$27.00
Price, Less Chuck with Taper Spindle	each	23.00

No. 50E Champion Electric Driven Sensitive Bench Drills



For light and rapid drilling. Made with ball bearings. Table swings 180 degrees horizontally. Adjustable spindle stop. Greatest distance from spindle to table 7½ inches. Up-and-down movement of spindle 2½ inches; of table 5 inches. Drills to center of 10-inch circle. Drilling capacity, ½ inch. Spindle speed, 900 and 2100 r.p.m. Diameter of table, 8 inches.

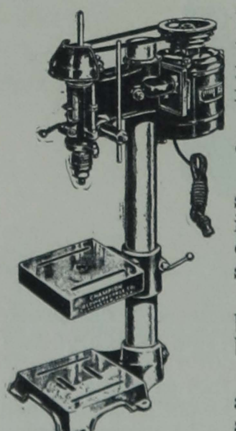
Motor, 110 volts 60 cycles single phase alternating current.

Height, 26 inches.

Weight, 105 pounds.

No. **50E**	each	$46.00

No. 1500B Champion Bench Drills



For drilling, routing, carving; can be used as wood shaper; also as a mortiser and sander with extra attachments. Ball-bearing throughout. For metal or wood work.

Sets firm on a base 16x11 inches, with column 2¾ inches in diameter.

Drills to center of 14-inch circle. The spindle has up-and-down travel of 4 inches. Full ball-bearing; spindle is enclosed between the ball bearings, which seals it entirely against dirt.

The spindle pulley runs on its own ball bearings; the belt pull is on the ball bearings.

Spindle is graduated, equipped with an automatic stop; also equipped with an adjustable steel pointer.

Table is 10x10 inches and can be tilted to any angle, and locked, and levelled in any position. Table and base are slotted for bolting on work.

Greatest distance from chuck to base, 16 inches. Machined surface of base is 10x10 inches. Spindle is equipped with ½-inch geared three-jaw adjustable chuck.

Motor is ⅓ h.p., 110 v., 60 cycle, a.c. split phase type, 1750 r.p.m., with attachment cord and plug. Motor is ball bearing.

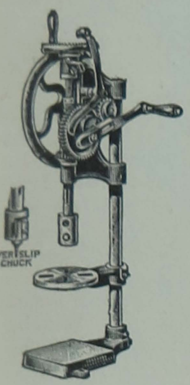
The head of the drill can be reversed and table placed above the reverse spindle, which permits the spindle to project through the center hole in the table, so that the edges of straight and circular work can be moulded. The head of the drill can be swung around giving the user the advantage of a radial drill press.

Capacity, ½ inch in iron. Spindle speeds, 437, 910, 1650, 2990, 5150 r.p.m. Weight 175 pounds.

No. **1500B**	each	$48.50

Champion Self-Feed Bench Drills

No. 104C



Ball bearings; lathe-turned and slotted table. Machine-jigged; all parts are standard and interchangeable.

Drills to center of 12-in. circle; drills holes from 0 to ¾ in. Spindle, ⅞ in. diameter; has up-and-down run of 3 in. Greatest distance from table to spindle, 7¾ in.; from spindle to base, 11¼ in. Height over all, 32 in. Equipped with 3-jaw chuck, taking straight shank bits up to ½ in.

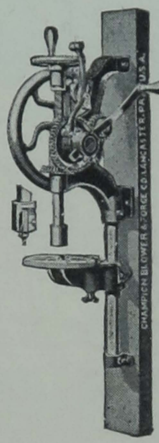
No. **104C**, Weight, 70 Lbs..each **$17.00**

No. 104P

Same as above, with tight and loose pulleys, 6-inch diameter and 2-in. face for power. Speed, 250 r.p.m.

No. **104P**, Weight, 90 Lbs.each **$15.50**

No. 98 Champion Self-Feed Post Drills


CHAMPION BLOWER & FORGE CO. LANCASTER, PA. U.S.A.

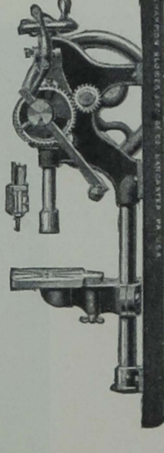
Spindle has end thrust ball bearings. Bearings ground out of solid metal. Has automatic self-feed. Drills from 0 to 1¼-inch hole to the center of a 14-inch circle. Spindle 1 inch in diameter; has up and down run of 3 inches.

Spindle bored to take in ½-inch straight shank drill bits. If specially ordered to take in ⅝-inch or ⁴¹⁄₆₄-inch.

No. **98**, Weight, 90 Pounds....each **$15.00**

No. **98P**, with T. & L. Pulleys 6 Inches in Diam. 2-Inch Face for Power; Speed, 250 R.P.M...each **19.00**

No. 93½ Champion Self-feed Post Drills



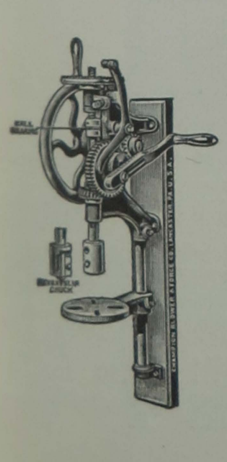
Has two speeds. Spindle has end thrust ball bearings. Has automatic self-feed. All bearings ground out of solid metal. Drills from 0 to 1¼-inch hole to the center of a 15-inch circle. Spindle 1⅛ inches in diameter; has up and down run of 3 inches. Spindle bored like Never Slip Chuck to take in ½-inch straight shank drill bits. If especially ordered to take in ⅝ inch or ⁴¹⁄₆₄-inch.

No. **93½**, Weight, 110 Pounds .... each **$19.00**

No. **93½P**, with T. & L. Pulleys, 6 Inches in Diameter, 2-inch Face for Power; Speed 250 R.P.M. ....each **23.00**

Champion Self-Feed Post Drills

No. 103



Back-geared. Spindle has end-thrust ball bearings. Lathe-turned and slotted table. Machine-jigged; all parts are standard and interchangeable.

Drills to center of 12-inch circle; drills holes from 0 to ⅝ inch. Spindle, ⅞ in. diameter; has up-and-down run of 3 in. Greatest distance from table to spindle, 8¾ in. Height of drill, 31 in. Spindle bored to take ½-in. straight shank drill bits.

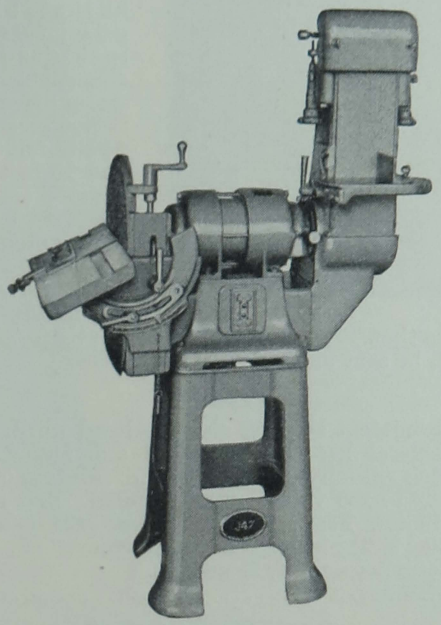
No. **103**, Weight, 60 Lbs....each **$9.50**

No. 103P

Same as above, with tight and loose pulleys, 6-in. diameter and 2-in. face for power. Speed, 250 r.p.m.

No. **103P**, Weight, 65 Lbs. each - **$13.50**

No. J-47 Yates-American Combination Sanders and Grinders



This machine consists primarily of a double-end motor mounted on a case to which may be attached the belt sander, disc sander, drum sander or grinder units to make up a complete machine. The motor is ball bearing and totally enclosed with a double fan cooling system. Push button control with overload protection. A floor stand supports the motor 36½ inches above the floor (from center line); without floor stand, 12½ inches. Motor for either 110 or 220 volts, single phase; or 220, 440 or 500 volt, 2 or 3 phase, 50 or 60 cycles. D.C. motor cannot be furnished.

If so specified motors of ¾ or 1 h.p. will be supplied on machines regularly furnished with smaller motors.

All units are provided with a built-in dust hood; 2½-in. O.D. outlet. All necessary wrenches are furnished.

Where units can be right or left, specify which is wanted.

Belt Sander Unit

Furnished for the right hand of the machine only. It consists of a 6x59-inch abrasive belt driven by an 8-inch pulley on the motor shaft and running over a 4-inch ball bearing idler pulley. The work table, used when the unit is in a vertical position, is 5x12 inches and may be tilted 30° toward the belt and 45° away. The table carries an angle gage, adjustable 45° either way and also adjustable across the table.

By loosening two screws, the belt unit may be placed either horizontally or vertically. A taper pin (chained against loss) locates the two pistons.

Disc Sander Unit

Furnished for either the right or left hand of the machine. The 15-inch diameter disc mounts directly on a collar on the motor shaft, the screws being put in from the back, leaving the abrasive surface unbroken. An extra disc goes with each machine so that production need not be interrupted while applying new abrasive. A table 9x20 tilts 15° up and 45° down. A vertical adjustment of 6 inches is controlled by a screw and hand crank. An angle gage, with 45° of adjustment each way fits on the table. This same gage may be placed parallel with the disc and used as a sizing gage. A core print gage fits on the table.

Drum Sander Unit

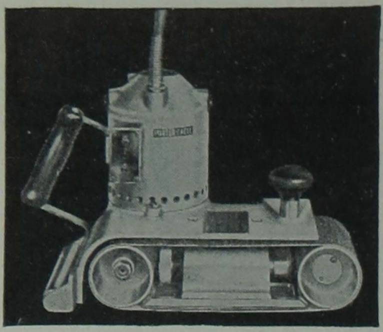
May be had for either right or left hand. Solid rubber type which expands within the abrasive sleeve when the end nut is tightened. The abrasive surface is 6 inches in diameter and 9 inches long. A 12x12-inch hinged table is adjustable to the cut desired and also may be swung up. Two abrasive sleeves are furnished regularly.

Grinder Unit

Made for either right or left hand. Takes 10-inch diameter wheels with any face up to 1¼ inches. No wheels are included. The wheel guard is substantial cast iron and has a hinged cover. An angle tool rest is regular equipment and is so arranged as to be universally adjustable.

Prices upon application.

Porter-Cable Take-About Sanders



Equipped with an adjustable roller guide; toggle switch; insulated handle; changeable form shoe; worm drive.

Equipment includes 6 belts, felt cover shoe, and 15 feet of rubber covered conductor cable with unbreakable duplex plug.

When ordering, state exact voltage of line as motors will not carry more than 10 per cent voltage variation. The 110-volt motor will be sent unless otherwise specified.

Type B-5

For intermittent sanding and overhead work. Equipped with a General Electric Universal a.c. and d.c. 1/3 h.p. motor which actually develops 1/2 h.p. Motors of any voltage from 32 to 250 volts can be supplied. Belt speed, 1250 feet per minute. Free speed. Belt size, 3x24 inches. Diameter of pulleys, 2¼ inches. Dimensions over all, 6x13½x8½ inches. Shipping weight, 21 pounds.

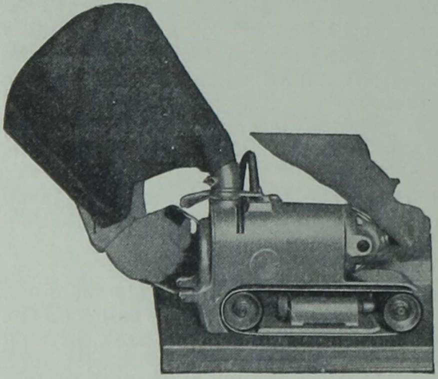
Type B-5 Sander.................................... **$78.00**

Types B-4 and B-44

For gruelling production work. Similar to Type B-5 except more powerful. General Electric a.c. and d.c. motor, compensated universal type. Any voltage from 32 to 250 inclusive can be furnished at slight extra cost. Belt speed, 1650 feet per minute. Free speed. Belt size, 4x27 inches. Diameter of pulleys, 2¾ inches.

Type	B-4	B-44
Sanders.................each	**$108.00**	**125.00**
Overall Dimensions.........in.	9½x7½x15½	10x7½x15½
Shipping Weight..........lbs.	31	32

Type B-10 Porter-Cable Dustless Take-About Sanders



For finishing and refinishing, polishing, sanding, and surfacing. Equipped with felt or canvas belt it may be used for polishing and rubbing stained and painted surfaces.

Has 110-volt Universal a.c. and d.c. motor, developing over 1 h.p. Switch is 10-ampere double pole type housed in bakelite case and located in top of frame.

Belt size, 3x27 inches; size of pulleys, 2½ inches in diameter by 3 inches wide, rubber covered.

Speed of drive pulley (idle), 2250 r.p.m.; belt speed (idle), 1475 feet per minute; belt speed using No. 2 abrasive belt, 1030 feet per minute.

Size over all, 4½ inches wide, 17 inches long, 9¼ inches high; bag, 19 inches high. Special dust bag for stone or marble if specified on order.

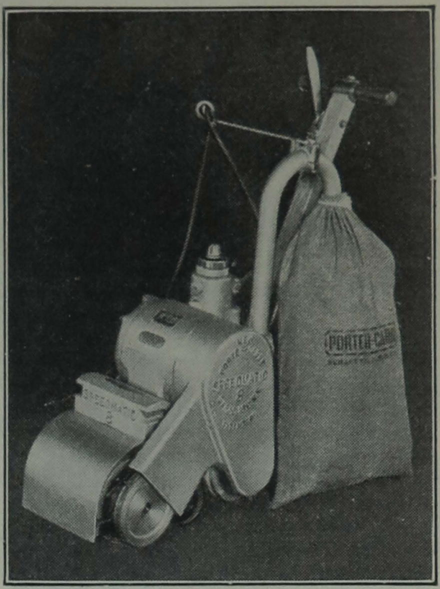
Equipment includes 6 belts, sanding shoe, and 15 feet of rubber covered conductor cable with unbreakable duplex plug. Exposed parts are made of polished cast aluminum and duralumin.

When ordering, state exact voltage of line as motors will carry only 10 per cent voltage variation. Any voltage from 32 to 250, inclusive, can be furnished at extra charge; 110-volt sent unless otherwise specified.

Shipping weight, 36 pounds.

Type B-10..............................each **$145.00**

Porter-Cable Speedmatic Floor Sanders



Non-slipping V-belt drive; double pole switch. Die cast vacuum fan driven by V-belt at 6000 r.p.m.

No. F-86 has special 1½ h.p. motor, capable of 2½ h.p. load for 110/220 volts, 60 cycle, one phase. Also d.c. No. F-82 same except ½ h.p.

Overall dimensions: Width, 13 inches; length, 31 inches; height including handle, 33 inches.

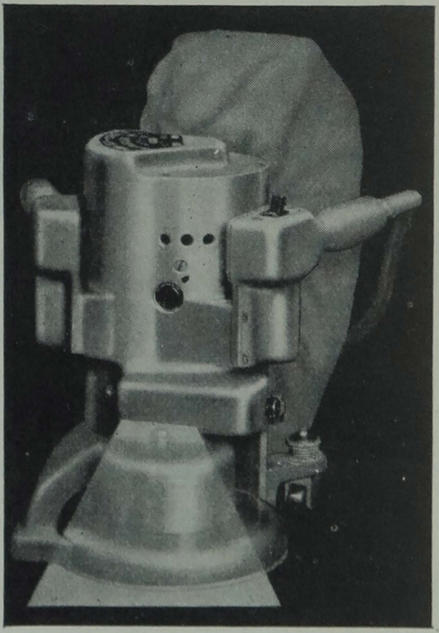
Drum is 8 inches wide, 7 inches in diameter, dynamically balanced, rubber-covered (felt optional).

If equipped with other than 60 cycle or d.c. motor the speed is slower but can be furnished for same speed if ordered. Equipped with 50 feet of rubber-covered conductor cable, wrenches for changing paper on drum, combination wrench, grease fittings, tube of grease, 6 sheets assorted paper and paper templet.

Type	F-82	F-86
Each	**$225.00**	**270.00**
Motor.....h. p.	½	1½
Drum Speed.....r.p.m.	850	1200
Surface.....ft. r.p.m.	1560	2200
Shipping Weight.....lbs.	220	256

A slight additional charge is made if d.c. motor is furnished as standard equipment.

Porter-Cable Edgers



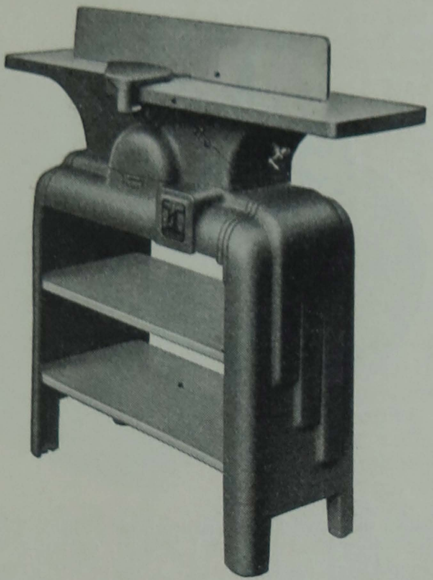
Has General Electric Universal a.c. and d.c. motor; completely sealed from dust collecting system. Type E-7 develops 1 h.p.; Type E-77 develops 1¼ h.p. Any voltage from 32 to 250 can be furnished.

Every moving part equipped with precision ball bearings. Extra husky hobbed gears, easily lubricated, reduction 3 to 1. Toggle switch. Disc, 7 inches in diameter.

No load speed, 3700 r.p.m.; cutting speed, 3200 r.p.m.

Type	E-7	E-77
Each	**$132.50**	**152.50**
Over-All Height.....inches	12	12½
Shipping Weight.....pounds	30	34

No. J-31 Yates-American Hand Jointers



Type BMD includes a standard frame motor, ball bearing type, 1800 r.p.m. driving cutterhead at 4250 r.p.m. through a V belt. Single phase motor has a toggle switch giving overload protection. Polyphase motor has a push button switch with overload protection. BMD machine is furnished with single phase, 110-volt, 60-cycle or 2 or 3 phase 220–440-volt, 50 or 60-cycle motors. 25-cycle or d.c. motor available.

Type DMD includes a built-in 3600 r.p.m. motor mounted directly on cutterhead arbor. A built-in push button switch with overload protection is furnished. Furnished with 220–440-volt, 3 phase 50 or 60-cycle motors only.

Three-knife, round cutterhead, 3¼-inch cutting circle runs in ball bearings.

Table is adjustable on long incline gibbed ways by hand knobs or ball crank convenient to operator. Surface of table is ground to a mirror-like finish to facilitate feeding of stock. Infeed table is 2½ inches wider than outfeed, to permit a rabbett cut, ½-inch deep.

Steel fence 5 inches high, 36 inches long with center support adjustable full width of machine. Tilts 45° with a positive stop at 45° and 90°. Scale to indicate degree of tilt.

Front guard hinged type, spring loaded, easily removable for rabbetting. Built-in guard for cutterhead back of fence.

Floor stand regularly furnished.

Type	Size In.	Table In.	H.P.	Weight Lbs.
BMD	6	36	½	360
BMD	6	42	½	375
BMD	6	50	½	390
DMD	6	42	½	375
DMD	6	50	½	385
BMD	8	36	¾	400
BMD	8	42	¾	420
BMD	8	50	¾	435
DMD	8	42	1	415
DMD	8	50	1	425

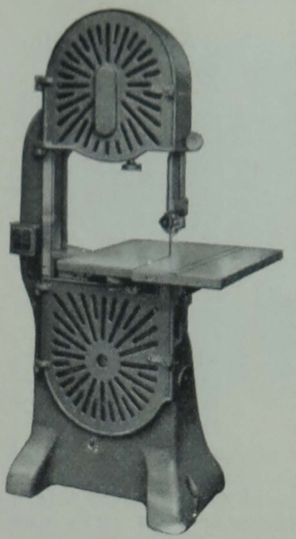
Prices upon application.

Yates-American Rubbers
For Band Saw Wheels

Wheel Diam. In.	Each	Band Width In.	Wheel Diam. In.	Each	Band Width In.
*16	**$1.50**	1	**37**	**$5.00**	2⅜
*20	**2.00**	1¼	**38**	**5.00**	2⅜
*30	**3.00**	1¾	**40**	**6.50**	2¾
32	**3.50**	1¾	**40**	**7.50**	3
34	**4.00**	2	***42**	**7.00**	2¾
*36	**4.50**	2¼	..	....	...

*Standard for Yates-American Machines.

No. Y-20 Yates-American Scroll Band Saws



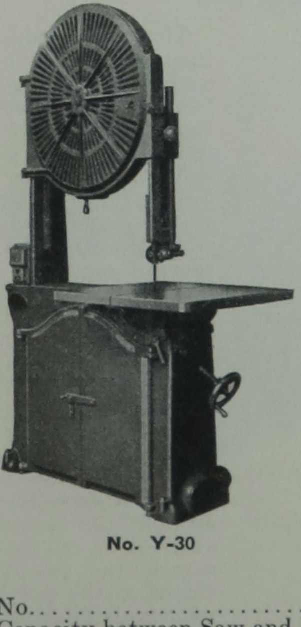
Suitable for industrial and school use. The frame is a one-piece casting. All working parts are carried within the frame; rotating members are accurately balanced. Hinged doors guard every moving part except at the point of cut.

The upper wheel of aluminum rotates upon ball bearings. This wheel, carried on a spring, provides the means for tensioning the saw. The saw is tracked by tilting this wheel by means of a convenient control. The lower wheel, of cast iron, is mounted directly on the motor shaft and the motor unit attached rigidly to the saw frame. The reinforced table is carried on a segment and it may be tilted 45° to the right and 5° to the left. A graduated scale permits accurate adjustment, and the table may be clamped in any desired position.

No.		Y-20
Diameter of Wheels	in.	20
Capacity between Saw and Frame	in.	19
Max. Capacity under Guide with Guard On	in.	10
Longest Saw That Can Be Used	ft.	11⅚
Shortest Saw That Can Be Used	ft.	11⅓
Width of Saw Blades That Can Be Used	in.	⅛ to 1
Table Dimensions	in.	26x26
Height of Table from Floor	in.	38
Motor Regularly Furnished (900 R.P.M.)	h.p.	1
Weight	lbs.	1150

Prices upon application.

Yates-American Scroll Band Saws



No. Y-30

Saws embody exclusive and advanced engineering features of design. Designed for production work in industrial plants but used also in the larger vocational and part time schools.

Totally enclosed aluminum disc wheels; quickly adjustable tilting table which may be tilted 45° to the right and 10° to the left.

Resaw type knife edge device for tensioning saw.

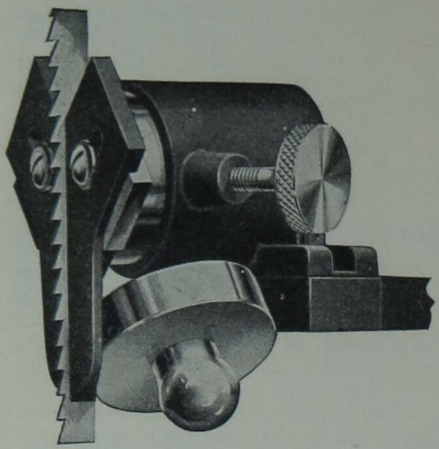
Modern electric motor equipment including push button switch control. Automobile type, braking mechanism for lower wheel. A unique method of attaching rubber wheel bands.

Built-in dust chute and completely guarded working parts assuring safety to the operator.

No.		Y-30	Y-36
Capacity between Saw and Frame	in.	29½	35½
Max. Capacity under Guide with Guard On	in.	16	20
Longest Saw Blade That Can Be Used	ft.	17⅙	20
Shortest Saw Blade That Can Be Used	ft.	16½	18⅔
Widths of Blades That Can Be Used	in.	⅛—1½	⅛—1¾
Main Table Dimensions	in.	28x30	36x36
Height of Table from Floor	in.	38	42
Motor Regularly Furnished, (900 R.P.M.)	h.p.	3	5
Weight	lbs.	2250	3730

Prices upon application.

Yates-American Mohawk Dutchman Band Saw Guides



A non-friction guide.

The wheel forming the back guide has a concave surface on its periphery and is set at an angle so that the back of the saw runs diagonally across the periphery of the wheel and revolves it. The point of bearing of the wheel against the back of the saw is constantly changed and prevents the saw grooving the surface of the wheel by a continued action in any one place. The saw has a bearing of 11/16 of an inch at the back. The wheel runs on a ball bearing; requires very little oil; never heats and is always in the proper position.

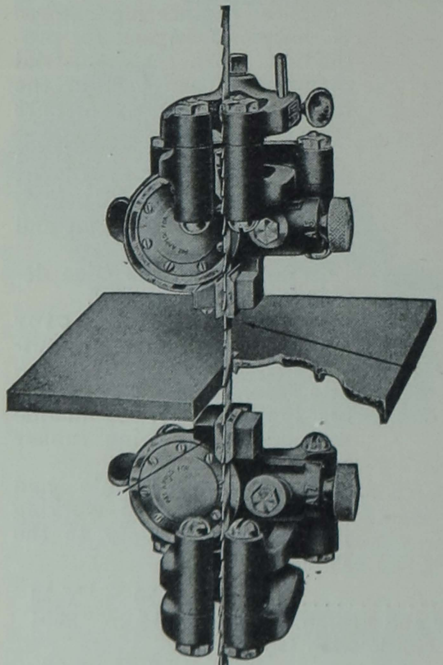
To do good work, the saw must run with all freedom possible. The Mohawk Dutchman embodies the principle that offers no resistance and guides the saw perfectly true. The large thumb screw at the side adjusts for saws of different widths. The screws at the front adjust for different gages.

Made as upper and lower guides, and applied to machine of any make.

Upper and lower guides can be furnished in both Nos. 1 and 2.

No.	1	2
Each	$17.50	20.00
Takes Blades up to ... in.	1	2

Yates-American Newell Automatic Band Saw Guides



The jaws or guiding parts have a swinging movement which allows the back of the saw to swing freely while the teeth are held practically stationary; impossible to twist the saw in the guide.

As the saw cannot bind against the guide plates, heavy side friction is eliminated, and wear on both guide plates and saw is greatly reduced.

The double faced ball-bearing roller on both the upper and lower guide, carries the entire thrust of the saw, reducing friction on the back edge of the saw.

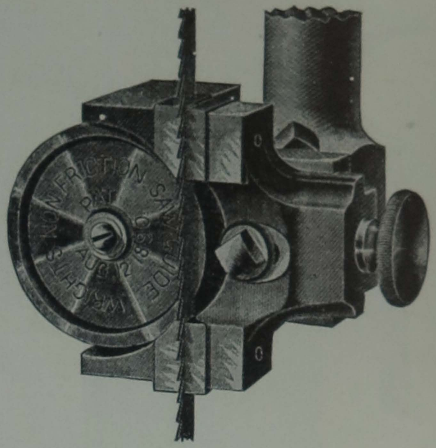
The operator can force the saw around the shortest curve without kinking or straining it.

With the guide swinging, smaller cuts and shorter curves can be made with larger saws, eliminating the need for small delicate saws. A 1¼-inch saw is as wide as need be used in any work on machines up to 48 inches.

In ordering, state name of band saw machine to which guides will be attached that proper fittings may be included.

Each **$20.00**

Yates-American Wright Band Saw Guides



Where backs of saws run against stationary guide plates, much heat is generated by the friction, causing saws to expand and crystallize at the back. This is the greatest cause of saws checking and breaking.

This non-friction band saw guide has a 1½-inch revolving bearing for saws without crystallizing or disturbing their temper. This overcomes this difficulty of saw breaking.

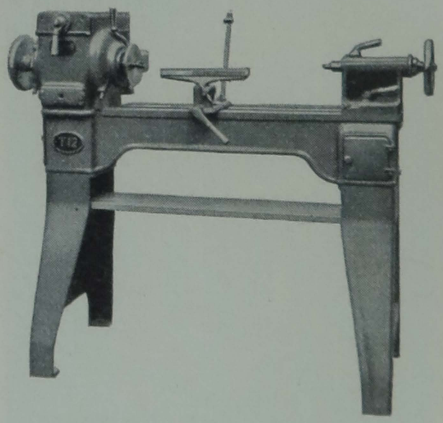
Wright Band Saw Guides are made as upper and under guides, to fit any make machine and to accommodate saws from 1/16 to 2½ inches wide. Fitted to any make machine.

No.	*0	**1	2
Each	$10.00	12.00	15.00
Takes Blades up to ... in.	1¼	1½	2½

*Used below the table on 30 and 36-inch machines.
**Used above the table.

No. T-12 Yates-American Speed Lathes

With 4-Speed Motor Headstock



A popular lathe for school shop use. Has a safety control that protects against accidental starting, a quick-acting brake that cuts off the power when applied, a positive spindle lock for use when changing plates, an easily operated tool rest lock, and a clamping device for the tailstock spindle.

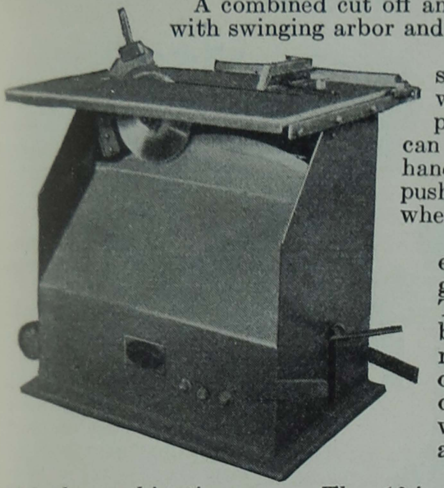
Direct motor drive, 4-speed motor, a.c., ½ h.p., 600, 1200, 1800 and 3600 r.p.m., completely enclosed motor control.

Bed, length, 48 inches with 26 inches between centers.

Regular equipment includes 1, ⅝-inch cup center; 1, 1-inch spur center; 1, 6-inch hand tool rest; 1, 12-inch hand tool rest; 1 rear tool shelf; 1, 8-inch rear face plate and hand wheel; 1, 6-inch front face plate; 1, 3-inch rosette chuck, 1 blueprint holder and one center drift rod; 1 square hollow chuck and 1 face plate wrench.

Prices upon application.

Jones Superior Speedsters



A combined cut off and rip saw equipped with swinging arbor and tilting table.

Frame is of sheet steel electrically welded into one solid piece. The Speedster can be picked up by the handles in front and pushed around like a wheelbarrow.

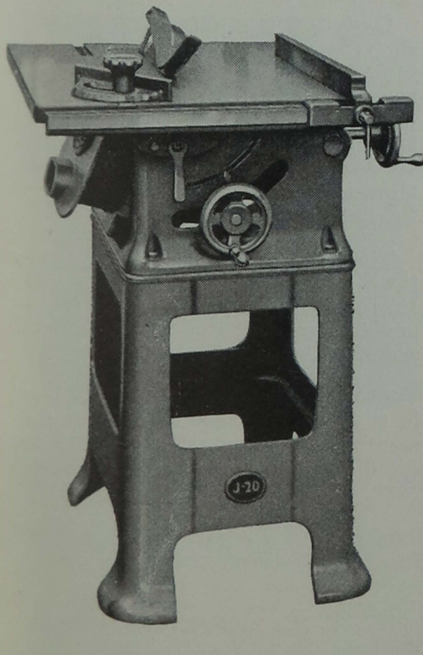
Furnished with electric motors or gas engine drive. The Speedster may be powered with various electric motors or gasoline engines depending on the work which is to be accomplished.

Furnished with a 10-inch combination saw. The 10-inch blade protrudes through table over 3 inches and will cut off 3x6, 2x10 and 1x12 inches. Can be used for ripping, mitering, rabbetting, tenoning, cutting of brass and copper rods and tubings, metal mouldings, etc. Changing from one operation to another is a matter of a few seconds.

Size of Table	in.	24x32
Height from Floor to Top of Table	in.	34
Size of Saw Arbor at Saw End	in.	¾
Size of Arbor Pulley	in.	2½
Largest Diam. Saw That Can Be Used	in.	12
Will Cut Off	in.	4x4, 4x6, 3x10
Maximum Width Ripping with Gauge	in.	12
Speed of Saw Arbor	r.p.m.	4500
H.P.		½ to 2
Floor Space	in.	30x38
Weight, with Electric Motor	lbs.	250
Weight, with Gasoline Engine	lbs.	450

Prices upon application.

No. J-20 Yates-American Tilting Arbor Variety Saws



The frame is a one-piece casting, heavily ribbed.

Table, 22x24 in.; removable throat plate. Dado heads up to 1 in. wide can be used. Alloy steel saw arbor mounted on ball bearings.

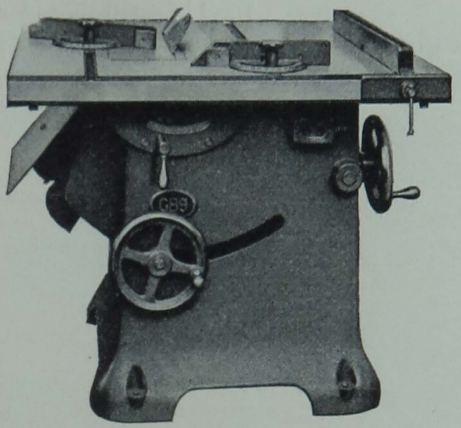
Saw unit adjustable within range of 2½ in. Motor tilts up to a 45° angle.

Constant speed type motor; 3600 r.p.m. A ½ h.p. motor is furnished.

One mitre cut-off gage, double face ripping fence, splitter and saw guard, 10-in. diam. 18 ga. comb. rip and cross cut saw, and floor stand are regular equipment.

No.		J-20
Maximum Depth of Cut	in.	2½
Width of Rip to Left of Saw	in.	9
Width of Rip to Right of Saw	in.	11
Width of Cut-Off	in.	10
Diameter of Saw Blade	in.	10
Diameter of Saw Arbor Where Saw Goes On	in.	¾
Height of Bench Type Machine	in.	12½
Height of Machine with Floor Stand	in.	36½
Weight	lbs.	335

No. G-89 Yates-American Tilting Arbor Variety Saws



For use in furniture factories, cabinet shops, etc.

The rotor of the high speed motor is mounted directly on the saw arbor. Totally enclosed, fan cooled, dust proof motor for 2 or 3 phase a.c. Push button switch control.

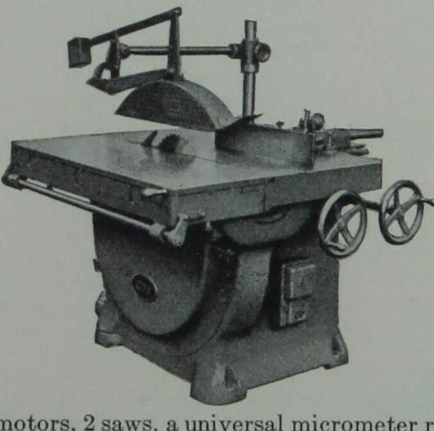
Spindle tilts 45° to right. Mounted on large deep groove ball bearings.

Standard equipment: One, 16-in. combination rip and cut-off saw; 2 graduated swivel cut-off gages; 1 double-faced box rip gage; 1, 1⅛-in. detachable end for dado heads up to 3-in. wide.

No.		G-89
Table Dimensions	in.	40x44
Height of Table from Floor	in.	34½
Regular Size of Motor	h.p.	5
Speed of Saw	r.p.m.	3600
Depth of Cut, Max. with 16-In. Saw	in.	4⅛
Width of Rip to Left of Saw	in.	17
Width of Rip to Right of Saw	in.	20
Stock Can Be Ripped	in.	26
Width to Cut-Off	in.	23
Maximum Size of Dado Head	in.	12x3
Diameter of Saw Blade	in.	16 or *18
Diameter of Saw Arbor Where Saw Goes On	in.	1⅛
Weight	lbs.	1600

*Saws larger than 16 in. are not recommended at this speed.

No. G-91 Yates-American Tilting Arbor Variety Saws



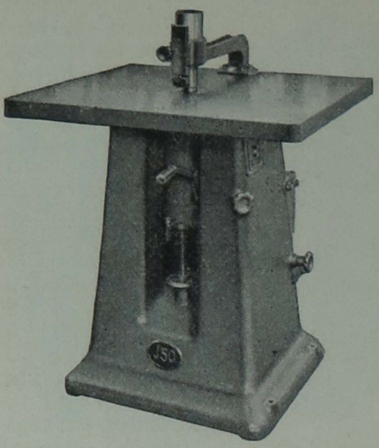
Has 2 saw arbor units, which revolve on a cradle within the frame of the machine; either one can be brought up quickly to operating position. Extra heavy saw arbors also serve as the rotor shafts of the motors, which are totally enclosed, fan cooled, dust proof and run in ball bearings.

Equipped with 2 motors, 2 saws, a universal micrometer ripping fence, 1 mitre pin-stop cut-off gage and 2 mitre cut-off gages; also cut-off gage rod. A spreader is mounted in back of each saw.

No.		G-91
Table Dimensions	in.	40x48
Roller Table, Width	in.	17
Height of Table from Floor	in.	35
Saw Motors	h.p.	2 of 5
Speed of Saws	r.p.m.	3600
Maximum Depth of Cut with 16-Inch Saw	in.	4⅛
Width of Rip to Right of Saw	in.	26
Width of Cut-Off	in.	31
Maximum Size of Dado Head	in.	12x2½
Diameter of Saw Blade	in.	16
Diameter of Saw Arbors Where Blades Go On	in.	1⅛
Maximum Tilt of Saw Arbors	degrees	45
Weight	lbs.	2640

Prices upon application.

No. J-50 Yates-American Single Spindle Shapers



Used in small shops for light shaper work. The spindle unit is mounted on gibbed ways which are adjustable for wear. The spindle bearings are lubricated with oil.

Base is a one-piece cored box type. Table has a heat treated top surface; prevents warping. A heavy rim insures stiffness and provides a good clamping surface. A table ring 4½ in. diam. is regularly furnished.

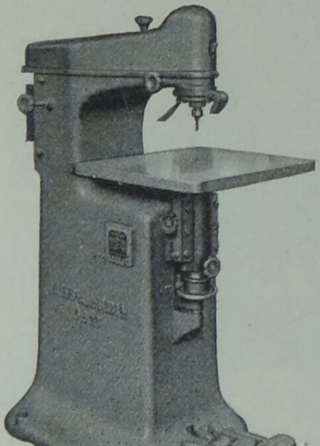
The guard cutterhead consists of a sleeve which entirely surrounds the cutter, being adjustable to expose only as much of the cutter as desired. Belted motor drive; an endless fabric belt from the vertical ball bearing motor hinged on the rear of the base. The motor unit is provided with a push button starter.

Equipment consists of 1, 1⅛x4½-in. detachable spindle top; 2, 2-in. diam. x ¾-in. thick knife collars; 2, 2-in. diam. x ¾-in. thick filler collars; 1 spindle nut; 1 table ring, 4½ in. O.D.; and 2½-in. rub. collar, 2⅛ in. I.D. One set of 1-in. shaper knives; 1 cutterhead guard and stock holddown and one set of wrenches.

No		J-50
Table Width	in.	38
Table Length	in.	30
Height of Table from Floor	in.	36
Spindle, Back from Front Edge	in.	13
Spindle Speed	r.p.m.	8500
Vertical Adjustment by Hand Wheel	in.	5

Prices upon application.

No. U-900 Yates-American Routers



Cuts freely and cleanly, with or against the grain.

The frame, including base, column, and overarm support for spindle unit, is a gray iron casting, heavily ribbed.

The vertical movement of the table is controlled by a pedal; may be held in operating position or firmly locked. Table height is adjustable. The tracer pin is provided with vertical adjustment. Removable table ring is furnished. Heat-treated steel spindle. An adjustable bar gages the depth of cut. Friction brake operates on the driving pulley.

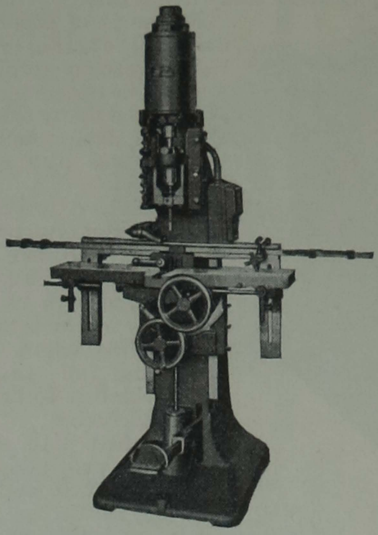
The motor is 3600 r.p.m. and may be furnished for 220, 440 or 550 volt, 2 or 3 phase, 50 or 60 cycle current. Push button switch control.

Equipment includes 1, ½-inch self centering chuck with wrench; 1, ¼-inch double end router bit; 1, ¼-inch adaptor; 1, 3/16-inch table pin.

No		U-900
Throat Capacity	in.	15
Table to Chuck, Maximum	in.	5
Table to Floor, Minimum	in.	36
Table to Floor, Maximum	in.	41
Table Adjustment	in.	3
Table Stroke	in.	2
Size of Table	in.	20x24
Speed of Spindle	r.p.m.	20000
Size of Motor Regularly Furnished	h.p.	1
Floor Space	in.	24x43
Weight	lbs.	825

Prices upon application.

No. K-25 Yates-American Hollow Chisel Mortisers



A high speed mortiser that is convenient and economical in operation, safe and thoroughly dependable. All ordinary adjustments are quickly made without the use of wrenches. Control levers and handwheels are convenient to the operating position.

The stationary mounting of the motor is attached directly to the spindle. The spindle that drives the bit is a splined shaft that slides up and down in the rotor shaft of motor.

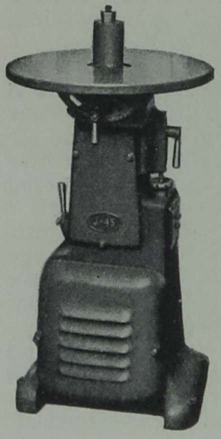
The chisel ram operates by footpower. The spindle has ball bearings.

Equipment includes 1 chisel any size up to capacity of machine with bit. When size of chisel is not specified, there will be furnished 1, ½-inch chisel, 4-inch blade with bit. A chisel bushing 1⅛-inch bore by 1⅜-inch O.D. and an adjustable bit bushing 19/64-inch bore by ¾-inch O.D. will be furnished.

No		K-25
Hardwood, Sq., Will Mortise up to	in.	⅝
Softwood, Sq., Will Mortise up to	in.	¾
Depth	in.	3½
Clearance Under Chisel	in.	12
Will Mortise in the Center of Material, Width	in.	5½
Speed of Spindle	r.p.m.	3600

Prices upon application.

No. J-45 Yates-American Oscillating Spindle Sanders



Designed for pattern and school shops where sanding is required on internal and irregular work. It is ruggedly built for continuous service with the oscillating mechanism totally enclosed within the base. The vertical adjustment of the table allows full use of the entire length of the abrasive roll.

The circular table not only has vertical adjustment but may be tilted 15° to the right and 45° to the left, the angle being indicated on a graduated scale.

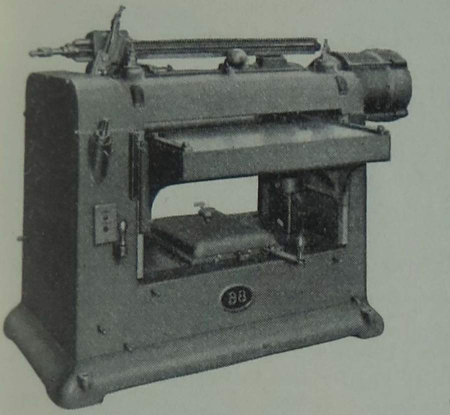
The ball bearing motor is enclosed in the base in a dust proof compartment and is coupled directly to the spindle by means of a splined connection.

The oscillation mechanism is in a separate compartment in the base, protected from dirt and from accidental contact with the operator.

No		J-45
Diameter of Circular Table	in.	20
Vertical Adjustment of Table	in.	3½
Maximum Height of Table	in.	38½
Minimum Height of Table	in.	35
Oscillation	strokes per minute	90
Length of Stroke	in.	½
Rubber Expanding Rolls	in.	1 to 3x6
Speed of Motor, A.C	r.p.m.	1800
Size of Motor Regularly Furnished	h.p.	½

Prices upon application.

No. B-8 Yates-American Single Surfacers



The only projecting parts are the motor on the motor driven machine and the guarded pulley on the belt driven model. All of the working parts are fully protected from dust and dirt, and because everything is enclosed, there is nothing to endanger the operator.

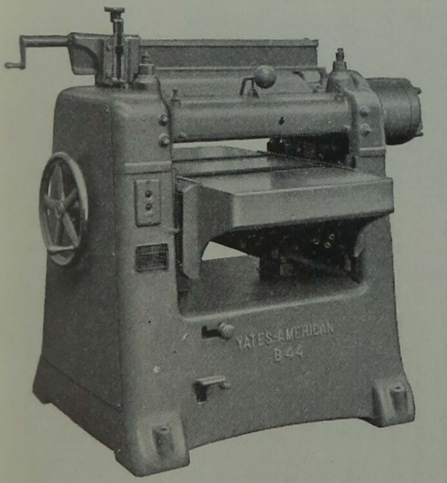
On the motor driven machines, the motor is built in with the rotor mounted directly on the cutterhead spindle. The rotor is short and the motor mounting very compact and rigid. The supporting bracket is mounted directly on the cutterhead box cap, eliminating all adjustments of the motor mounting.

Rugged construction, easy adjustment, enclosed cut gear feed works, bronze bushings for all shafts, ball bearing cutterhead, smooth performance and dependability.

Capacity, Width......................in.	24	30
Capacity, Thickness..................in.	1/8 to 8	1/8 to 8
Shortest Stock, Butted...............in.	4	4
Shortest Stock, Not Butted...........in.	14	14
Diameter of Cutterhead...............in.	5 1/8	5 1/8
No. of Knives in Cutterhead............	4	4
Speed of Cutterhead...............r.p.m.	3600	3600
Diameter of Feed Rolls...............in.	5	5
Size Motor Regularly Furnished.....h.p.	10	15
Weight..............................lbs.	3000	3300

Prices upon application.

No. B-44 Yates-American Single Surfacers



Frame is a one-piece casting. All working parts enclosed. The bed raises and lowers on screws and is supported on ball thrust bearings.

Gears transmit power to feed rolls through roller chain. Feed can be started, jogged and stopped by foot treadle operating belt tightener. Feed rolls are solid, power driven, 1/2-inch yield through spring pressure.

Chip breaker is solid, concentric with cutterhead, 3/4-inch yield.

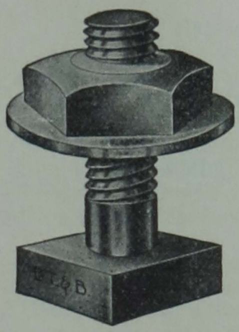
Cylinder type cutterhead. Runs on ball bearings. Extra heavy pressure bar; concentric with head.

Grease lubrication, by pressure.

No.....................................	B-44
Capacity, Width.........................in.	24
Capacity, Thickness.....................in.	8
Floor Space.............................in.	40x66
Shortest Stock, Butted..................in.	3 1/4
Shortest Stock, Not Butted..............in.	11
Diameter of Cutterhead..................in.	4 1/4
No. of Knives in Cutterhead................	3
Speed of Cutterhead..................r.p.m.	3600
Diameter of Feed Rolls..................in.	4
Rate of Feed per Minute.................ft.	20 and 40
Size Motor Regularly Furnished.........h.p.	7 1/2
Weight.................................lbs.	2700

Prices upon application.

Steel Planer Head Bolts, Nuts and Washers



Bolts are furnished with or without nut and washer, as ordered. Square or hexagon head made to order.

Orders for bolts should state width and thickness of head and length under head, diameter of screws and if nuts and washers are wanted, so specify. All V threads of 12 threads to the inch unless otherwise specified.

Special planer, sticker, moulder or shaper bolts can be made to order on receipt of sample with specifications.

Add 6 cents each to price given for planer bolts, case-hardened.

Price, per Hundred, without Nuts or Washers

Diam. Screw . . . in.		7/16	1/2	1/2	9/16	5/8	3/4
Square Head . . . "		1	1	1 1/8	1 1/8	1 1/8	1 1/4
Thickness Head. . "		1/4	5/16	5/16	5/16	3/8	3/8
Length Under Head to Extreme Point Inches	1	$30.00	$34.00	$34.00	$37.50	$37.50	$42.50
	1 1/4	31.00	35.00	36.00	39.00	39.00	44.00
	1 1/2	32.00	36.00	37.50	40.00	40.00	45.00
	1 3/4	34.00	37.50	39.00	41.00	41.00	46.00
	2	35.00	40.00	40.00	42.50	42.50	47.50
	2 1/2	37.50	42.50	42.50	44.00	44.00	49.00

Planer Head Bolt Nuts—Case-hardened

Diameter Screw Inches	Short Diameter of Nuts Inches	Thickness of Nut Inches	Price per 100
7/16	1 1/4	3/8	**$24.00**
1/2	1 1/2	3/8	**28.00**
9/16	1 1/2	3/8	**31.00**
5/8	1 1/4	3/8	**34.00**
11/16	1 1/4	3/8	**37.50**
3/4	1 1/4	1/2	**41.00**

Planer Head Bolt Washers

Accurately made of cold-drawn bar stock.

Price.......................................each **$.08**

Machine Knives

These knives are made with the idea of quality uppermost. Each knife is guaranteed free from imperfections as to material, temper, grinding, welding or finish, and to fit, provided proper instructions have accompanied the order.

In this day and age it is essential that machine knives meet the tests incurred by maximum production. Modern methods of manufacturing machine knives have more than kept pace with the demand for knives that will meet the most difficult requirements.

Among the various kinds of knives made are the following: Stave jointer, chipper, shingle, hog, moulding, stave, gaining, spoke, planer, plane iron, chamfer, paper cutter, novelty siding, groover, beader, shaper, double end chain, veneer, spoke, rabbeting, sarven, hub finisher and shaper, squaring, tenon, rougher, Howell cutter, croze bit, barrel, hoop, metal shear, boiler shear, fur, excelsior, roll scraper, stop cutter, barkmill, leather splitter, skiving, wood clipper, trimmer, cope, chair bottom, bevel edge shaper, matcher, corrugated chipper, lithograph stone planer, special shears, washboard, cheese, paper slitter, meat chopper, beet sugar, kraut and vegetable, scraper and segment carbon cutter knives. High-speed steel knives are a specialty, also.

How to Order Machine and Other Knives

In ordering machine, planer and other knives, place the knife face down with the bevel up, using a strong piece of paper on which to mark around to show the length of knife as well as size and position of slots. Be sure to state the width and thickness desired, bevel and the quantity wanted. State also how many knives to a set. If for slotted head, give the number and size of slots. If for solid head, it is absolutely necessary for the order to be accompanied by a pattern. State whether knives should be back leveled, or left square. It is a good plan to give the name and number of machine for which knives are ordered, especially if ordering paper cutters. In ordering special knives, always send a drawing or a blue print with full information.

General Belt Information

Determination of Length

The most accurate method of finding the length of a belt is to measure with a steel tape, following the course of the belt around the pulleys.

To calculate the length when the pulleys are of equal diameters, add the diameters of the two pulleys, divide by two and multiply by 3-1/7. To this product add twice the distance between the centers of shafts.

When the pulleys are of unequal diameters, add the diameters of the two pulleys, divide by two, multiply by 3-1/7, and add the produce to twice the distance between the centers of the shafts as before. Then multiply the difference between the pulley diameters by itself and divide the product by four times the distance between the centers of the shafts. Add the two results to determine the total length of the belt around the pulleys.

Determination of Plies

Belts should be as wide and thin as operating conditions permit. In selecting a belt for a drive, the conditions should be considered and the width and ply chosen by referring to Table 20-D.

Information Table 21-C

Minimum Pulley Diameters

For long normal life, belts should be operated on pulleys of the minimum sizes shown below. It is at times, however, necessary to run them on pulleys of less diameter, in which cases there may result a reduction in longevity.

Ply	Speed of Belt per Minute, Feet					
	1000	2000	3000	4000	5000	6000
3	2	3	3	4	4	5
4	4	5	5	6	6	7
5	6	7	8	9	10	12
6	10	12	14	14	16	18
7	14	16	18	20	22	24
8	18	20	24	26	28	32
9	24	28	30	34	36	40
10	30	34	38	40	44	48

Determination of Width

The selection of as wide a belt as the pulley faces permit is advisable. For narrow belts, the pulleys should be one inch wider and for wide belts two inches wider than the belt, though where it is necessary, there is no great disadvantage in having the belt as wide as the face of the pulleys, provided the pulleys and shafts are in alignment. It often becomes necessary, in order to obtain sufficient power, to thus widen the belt, and every inch additional width means a proportional increase in the power that the belt will transmit. For instance, if the belt in use is 8 inches in width, increasing it to 10 inches adds 25 per cent to the power it will transmit.

When the pulleys are not of the proper size to take a belt of the ply and width needed to transmit the power desired it will usually pay to change the drive, using larger pulleys. Where it is impossible to increase the size of the pulleys the trouble may be eliminated by the use of two thin belts, one running on top of the other as Rider belt. In this case the upper belt may be narrower and slightly tighter than the lower. The two belts should not be fastened together. This makes in some cases a satisfactory and economical makeshift on horizontal, inclined or vertical drives, but its economy is questionable where belt speeds are high owing to the wear caused by the slip or creep of one belt on the other. Where the tight or pulling side is the upper run of belt, a Rider belt cannot be used satisfactorily at high belt speeds, and by high speed is meant 3500 f.p.m., or over.

Comparison with Leather

Roughly speaking, Compensated and Condor have about the following transmitting values compared with first quality leather: 3-ply equals light single leather, 4-ply equals heavy single leather, 5-ply equals light double leather, 6-ply equals heavy double leather, 7-ply equals extra heavy double leather and 9-ply equals triple leather.

Horsepower Rating of Condor Compensated Belt

Also Condor Silver Edge

Table 20-D is based on an arc of contact of 180 degrees. For less arc of contact the rated horsepowers shown in the table should be multiplied by the following factors:

Arc of Contact	180°	170°	160°	150°	140°
Factor	1.00	.95	.90	.85	.80

The arc of contact may be derived by the following formula:

$$\text{Arc of Contact} = 180^\circ - \frac{(D-d)\ 60}{C} \text{ where}$$

D = diameter of large pulley in inches; d = diameter of small pulley in inches; C = center distance in inches.

For Condor Standard Folded Edge Figure 10 Per Cent Below Ratings Given in This Table

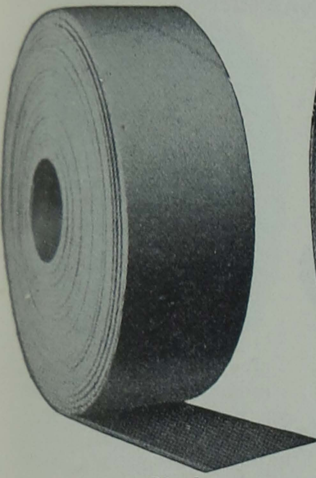
Table 20-D Per Inch of Width at 180° Arc of Contact

Ply	Smaller Pulley Diam. In.	Speed of Belt per Minute, Feet							
		1000	1500	2000	2500	3000	4000	5000	6000
3	2	1.1	1.6	2.0	2.5	3.0	....	....	....
3	3	1.2	1.7	2.2	2.7	3.2	3.5	....	....
3	4	1.3	2.0	2.5	3.0	3.6	4.3	4.8	5.0
3	6	1.5	2.2	2.8	3.4	4.0	4.8	5.3	5.6
3	8 and over	1.6	2.4	3.0	3.8	4.4	5.3	6.0	6.2
4	3	.7	.1	1.3	1.6	1.8	....	....	....
4	4	1.0	1.4	1.8	2.0	2.6	3.0	....	....
4	6	1.3	2.0	2.5	3.0	3.6	4.3	4.8	5.0
4	8	1.7	2.5	3.2	3.8	4.5	5.4	6.0	6.3
4	10	1.9	2.7	3.5	4.2	5.0	6.0	6.7	7.0
4	12 and over	2.0	3.0	4.0	4.6	5.5	6.6	7.4	7.7
5	5	.9	1.3	1.7	2.1	2.4	....	....	....
5	6	1.1	1.6	2.1	2.6	3.0	3.6	....	....
5	8	1.6	1.8	3.0	3.7	4.3	5.2	5.8	6.0
5	10	2.0	3.0	3.8	4.6	5.4	6.5	7.2	7.6
5	12	2.2	3.2	4.2	5.0	6.0	7.2	8.0	8.4
5	18 and over	2.6	3.8	5.0	6.0	7.2	8.6	9.6	10.0
6	8	1.3	2.0	2.5	3.0	3.5	....	....	....
6	10	1.8	2.7	3.5	4.3	5.0	5.6	....	....
6	12	2.3	3.4	4.4	5.4	6.3	7.6	8.4	....
6	14	2.6	3.8	5.0	6.0	7.0	8.4	9.3	9.8
6	18	2.8	4.0	5.4	6.6	7.7	9.2	10.3	10.8
6	24 and over	3.1	4.5	6.0	7.2	8.5	10.2	11.3	12.0
7	12	2.4	3.5	4.6	5.6	6.5	....	....	....
7	14	2.6	3.8	5.0	6.0	7.2	8.6	....	....
7	18	3.0	4.4	5.7	7.0	8.0	9.6	10.6	11.2
7	24	3.5	5.0	6.7	8.2	9.6	11.5	12.8	13.4
7	30 and over	3.7	5.4	7.0	8.5	10.0	12.0	13.4	14.0
8	16	3.0	4.4	5.7	7.0	8.0	....	....	....
8	18	3.3	4.8	6.3	7.7	9.0	10.8	....	....
8	24	3.6	5.3	7.0	8.4	10.0	12.0	13.2	14.0
8	30	4.0	5.8	7.6	9.3	11.0	13.0	14.6	15.3
8	36 and over	4.1	6.0	7.8	9.5	11.2	13.4	15.0	15.7
10	24	3.7	5.4	7.0	8.5	10.0	....	....	....
10	28	4.0	6.0	7.7	9.4	11.0	13.2	....	....
10	36	4.8	7.0	9.2	11.2	13.2	15.8	17.5	18.5
10	48 and over	5.3	7.8	10.2	12.4	14.5	17.5	19.5	20.5
12	36	4.3	6.3	8.2	10.0	11.7	....	....	....
12	40	5.0	7.0	9.0	11.5	13.0	15.5	....	....
12	48	5.7	8.3	11.0	13.3	15.6	18.5	21.0	22.0
12	54 and over	6.3	9.2	12.0	14.5	17.2	20.5	23.0	24.0

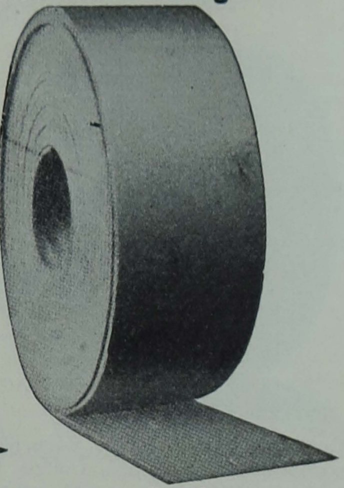
Interpolate for intermediate speeds and pulley diameters.

For economical and efficient operation, do not use pulleys smaller than sizes shown in this table.

Oak Tanned Leather Belting



Single



Double

Width In.	Price, per Ft. Single	Price, per Ft. Double	Width In.	Price, per Ft. Single	Price, per Ft. Double	Width In.	Price, per Ft. Single	Price, per Ft. Double
½	$.12	$.24	6	$1.44	$2.88	34	$8.16	$16.32
¾	.18	.36	7	1.68	3.36	36	8.64	17.28
1	.24	.48	8	1.92	3.84	38	9.12	18.24
1¼	.30	.60	9	2.16	4.32	40	9.60	19.20
1½	.36	.72	10	2.40	4.80	42	10.08	20.16
1¾	.42	.84	12	2.88	5.76	44	10.56	21.12
2	.48	.96	14	3.36	6.72	46	11.04	22.08
2¼	.54	1.08	16	3.84	7.68	48	11.52	23.04
2½	.60	1.20	18	4.32	8.64	50	12.00	24.00
2¾	.66	1.32	20	4.80	9.60	52	12.48	24.96
3	.72	1.44	22	5.28	10.56	54	12.96	25.92
3½	.84	1.68	24	5.76	11.52	56	13.44	26.88
4	.96	1.92	26	6.24	12.48	60	14.40	28.80
4½	1.08	2.16	28	6.72	13.44	64	15.36	30.72
5	1.20	2.40	30	7.20	14.40	68	16.32	32.64
5½	1.32	2.64	32	7.68	15.36	72	17.28	34.56

Solid Rounded Leather Belting

Size Inches	Per Foot	Thick Inches	Style	Size Inches	Per Foot	Thick Inches	Style
1/8	$.09½	8/64	Heavy	5/16	$.19½	14/64	Regular
3/16	.10	12/64	Heavy	5/16	.25	17/64	Heavy
7/32	.13½	14/64	Heavy	11/32	.26	16/64	Regular
¼	.14	13/64	Regular	11/32	.31	18/64	Heavy
¼	.16½	15/64	Heavy	3/8	.32	16/64	Regular
9/32	.17	14/64	Regular	3/8	.40	18/64	Heavy
9/32	.19	16/64	Heavy	½	.60	22/64	Heavy

Tolerance in thickness of ±1/32 in., in width of ±1/64 in.

BELT REPAIRS

●

In conjunction with our complete stock of belting we maintain a belt repair shop in charge of a real belt maker.

We are prepared to repair belts either at your plant or our shop, day or night.

Thickness of Leather Belting

The American Leather Belting Association has decided that for the greater protection of the consumers of leather belting, it should establish and sell this commodity by specifications of thickness instead of weight thereby discarding the old weight terminology of "ounces per square foot" which may be varied by the mere addition of weighting materials to the leather, and does not necessarily always represent a differential in transmission values.

The thicknesses specification for flat leather belting referred to above and adopted by the Association on Jan. 1, 1935, is as follows:

Medium Single	11/64 Inch Average
Heavy Single	13/64 Inch Average
Light Double	18/64 Inch Average
Medium Double	20/64 Inch Average
Heavy Double	23/64 Inch Average

Allowable tolerances for all thicknesses plus or minus 1/64-inch from above averages.

All thicknesses in this table are average thickness in inches, and should be determined by measuring 20 coils and dividing this total by the number of coils measured.
In rolls of belting containing less than 20 coils, the average thickness should be determined by measuring all the coils in the roll.

Uniformity: No point in single belting shall be more than 3/64 inch thicker or more than 2/64 inch thinner than the average thickness. With doubles, the tolerance shall be 2/64 inch thicker or thinner than the average.

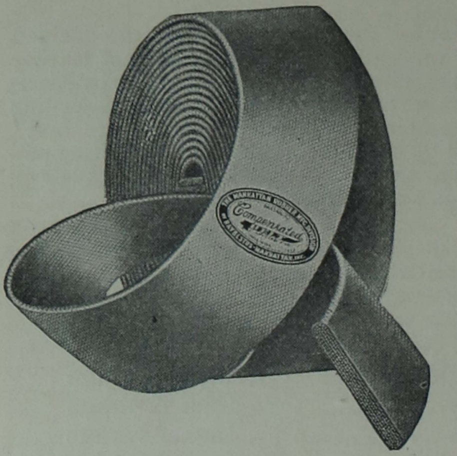
Average Net Weights of Rubber Belting

Size Inches	Weight, Pounds, per 100 Feet — No. of Plies 3	4	5	6	7	8	9	10	11
2	17	21	..	..	..	...	...	...	...
3	26	32	38	..	..	...	...	...	...
4	35	42	50	59	67	...	...	...	...
5	42	53	63	73	84	...	...	...	...
6	52	63	75	88	100	113	...	...	...
7	..	74	88	103	117	132	...	...	...
8	..	84	100	117	134	151	168	...	...
9	..	95	113	132	150	170	189	...	...
10	..	105	126	147	167	188	210	231	...
11	..	116	138	161	184	207	231	254	...
12	..	126	151	176	201	226	252	277	302
13	..	...	163	190	217	245	273	300	327
14	..	...	176	205	234	264	294	323	353
15	..	...	188	220	251	285	315	346	378
16	..	...	201	234	268	301	336	369	403
18	..	...	226	264	301	339	377	415	453
20	..	...	251	293	334	377	419	462	504
22	..	...	276	322	368	414	461	508	554
24	..	...	301	352	401	452	503	554	605
26	..	...	327	381	435	490	545	600	655
28	..	...	352	410	468	528	587	646	705
30	..	...	377	440	502	565	629	692	756

Weights of larger sizes in proportion.

Condor Compensated Belting

The Low Tension Belt



Compensated belt is so constructed that the stresses are equally borne by all the plies.

It is free from rupture in outside ply; ply separation; wear on pulley side; and bearing, shafting and hanger trouble.

Has a high efficiency regardless of atmospheric conditions; high efficiency when run at low tension and on small pulleys.

Where there is considerable dust, it may be effectively dressed. Can be made endless in the same manner as any rubber belt.

Condor Standard Belts

With Folded Edge

The original red friction surface belt for general transmission service. Supreme in strength, pulley adhesion, efficiency, longevity and freedom from trouble.

A Handbook of Condor Belt describing, in detail, best practice to be followed in applying and using the belt will be gladly furnished upon request.

Delhi Rubber Belting

Rubber Covered

A reliable and serviceable belt at a medium cost. Will give most satisfactory results for all ordinary requirements.

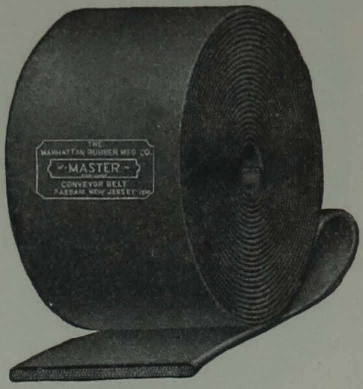
Price, per Foot—Effective July 10, 1925

Size, In.	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply	7-Ply	8-Ply
1	$.18	$.20	$.24	.....	.....	.....	.....
1¼	.23	.26	.30	....	.....	.....	.....
1½	.27	.31	.36	$ 45	.....	.....	.....
1¾	.32	.36	.42	.53	.....	.....	.....
2	.34	.39	.46	.58	$.69	$.81	$.92
2½	.42	.48	.56	.70	.84	.98	1.12
3	.48	.55	.65	.81	.98	1.14	1.31
3½	.57	.65	.76	.95	1.14	1.33	1.52
4	.61	.70	.82	1.03	1.23	1.44	1.65
4½	.68	.78	.92	1.16	1.38	1.61	1.84
5	.76	.87	1.02	1.28	1.53	1.79	2.05
6	.91	1.04	1.22	1.53	1.83	2.14	2.44
7	1.07	1.22	1.43	1.79	2.15	2.50	2.86
8	1.15	1.31	1.54	1.93	2.31	2.70	3.08
9	1.29	1.47	1.73	2.16	2.60	3.03	3.46
10	1.43	1.63	1.92	2.40	2.88	3.36	3.84
11	1.57	1.79	2.11	2.64	3.17	3.69	4.22
12	1.72	1.96	2.30	2.88	3.45	4.03	4.60
13	1.86	2.13	2.50	3.13	3.75	4.38	5.00
14	2.00	2.29	2.69	3.36	4.04	4.71	5.38
15	2.14	2.45	2.88	3.60	4.32	5.04	5.76
16	2.29	2.62	3.08	3.86	4.62	5.40	6.16
18	2.57	2.94	3.46	4.32	5.20	6.06	6.92
20	2.85	3.26	3.84	4.80	5.76	6.72	7.68
22	3.14	3.59	4.22	5.28	6.34	7.38	8.44
24	3.42	3.91	4.60	5.76	6.90	8.06	9.20
26	3.71	4.26	5.01	6.26	7.50	8.76	10.00
28	4.00	4.57	5.38	6.72	8.08	9.42	10.76
30	4.29	4.90	5.76	7.20	8.64	10.08	11.52
32	4.59	5.25	6.18	7.72	9.24	10.80	12.32
34	4.87	5.56	6.54	8.18	9.82	11.46	13.08
36	5.14	5.87	6.91	8.64	10.40	12.12	13.84
38	5.43	6.21	7.31	9.14	10.96	12.78	14.60
40	5.72	6.54	7.69	9.61	11.52	13.44	15.36
42	6.00	6.86	8.07	10.09	12.10	14.10	16.12
44	6.28	7.18	8.45	10.56	12.68	14.76	16.88
46	6.57	7.51	8.83	11.04	13.24	15.44	17.64
48	6.85	7.83	9.21	11.51	13.80	16.21	18.40
50	....	....	9.60	12.02	14.40	16.82	19.20
52	....	....	10.00	12.52	15.00	17.52	20.00
54	....	....	10.38	12.98	15.58	18.18	20.76
56	....	....	10.76	13.44	16.16	18.84	21.52
58	....	....	11.14	13.92	16.72	19.50	22.28
60	....	....	11.52	14.40	17.28	20.16	23.04

Prices on heavier plies upon application.

Condor Conveyor Belts

Homo-Flex Construction



CARCASS.—Fabric is a special construction resembling cord duck fabric. Cannot be compared in physical characteristics with ordinary ducks.

HOMOGENEITY.—Because of the unique weave of the fabric, the rubber bonding material goes completely through the fabric; fabric is thoroughly impregnated and is imbedded in a matrix of rubber forming a homogeneous whole.

RUBBER COVERS.—Rubber Cover is Black with red brand and has the highest abrasion resisting properties. For hot material, we furnish a special hot ore cover when specified.

EDGES.—Edges are stiffened with an extra ply of fabric extending into the belt for 2 to 3 inches depending upon the belt width. This provides additional edge stiffness, prevents spillage, and adds to the belt strength at edges. The rubber edge covers have a high adhesion to the fabric.

ADVANTAGES.—Extreme flexibility—troughs perfectly, even in thick ply and long narrow belts; reduces stretch to a minimum; gives longer belt life. Ply separation eliminated; inseparable wear-resisting covers; resists puncture to a high degree; may be used on smaller end or tripper pulleys.

SERVICE.—Recommended for hard service; shows high ultimate economy in less severe and ordinary service.

SIZES.—Made in two weights: Standard, 28 oz. and Heavy Duty, 32 oz.

Super Master Conveyor Belt

A super quality belt, designed for abnormally severe conditions. Will give ultimate economy in the carrying of heavy, abrasive ore or rock in large lumps and in great tonage; also on coke wharves at By-Product-Coke Plants where the service is continuous and the annual tonnage high. Made of 36, 32 and 28-ounce duck, depending on the belt tension, on the size and weight of the lumps and on the severity of the feed conditions.

Master Conveyor Belt

This is intended for conveying heavy, highly abrasive materials in large quantities, or where a tripper or small end pulleys are in use. It will give highly economical service in handling large rock, heavy ore in large size, run-of-oven coke, cement clinker, etc. Made of either 32 or 28-oz. duck depending on the belt tension, the size and weight of lumps and the severity of the feed conditions.

International Conveyor Belt

Designed for service where the materials carried are abrasive and handled in large quantity under hard operating conditions. A belt that offers high economy in the handling of crushed rock and ore up to 4-in. size; coke, large gravel and sand mixed wet or dry, concentrates, run-of-mine coal, clinker, cement and similar heavy, abrasive materials. Made of either 28 or 32-oz. duck depending on the belt tension that is specified.

Delhi Conveyor Belt

Recommended for general conveyor service of average severity; that is where the materials carried are moderately abrasive and operating conditions not too severe. A reliable belt and one of high ultimate economy in the handling of bituminous coal, either run-of-mine, crushed or pulverized, rock or ore crushed up to 2-in. size, sand, small gravels, lime, wood chips, soil, sugar, sugar beets, pulp, packages and boxes. Made of either 28 or 32-oz. duck depending on the belt tension that is specified.

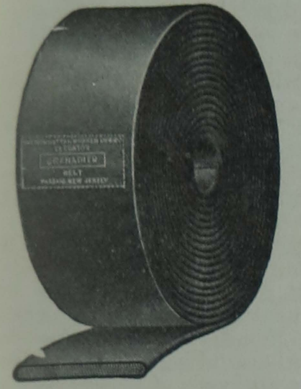
Making Belts Endless at the Factory

Under 10 In. Wide	Add Cost of 15 Extra Feet
10 In. Wide and Wider	Add Cost of 10 Extra Feet

Prices upon Application

Bucket Elevator Belts

Grenadier Elevator Belts



Intended primarily for wet conditions and extremely severe service. Economical in the handling of wet ores, concentrates and tailings, wet gravels, etc., in large quantities. Made of heavy, powerful 35-oz. silver hard duck with a skim coat of rubber between plies to prevent the creeping of moisture from one ply to the next and to add to the flexibility of the belt. When there is a tendency to tear rather than wear the cover from the belt, a tough, open weave breaker strip may be inserted in the cover on pulley side, occasionally on bucket side also, to retard this action. It is standard practice to use breaker strips on covers 3⁄32 inch thick and over.

Dreadnaught Elevator Belts

Designed for severe work and to meet dry conditions such as are found in stone crushing plants, ore reduction mills, coal and ash handling installations, and a wide variety of industrial plants where heavy materials in bulk are handled by means of bucket elevators. Regularly made with heavy powerful 36-oz. duck to resist severe tension often found in bucket elevators and to securely hold the bucket bolts.

Dreadnaught is also made of 32-oz. duck, where the lift is not high, where the buckets are of thin steel or where the pulleys are small in diameter.

Delhi Elevator Belts

Delhi Elevator Belt is built on 32-oz. duck and is designed for general service in the handling of light materials of non-abrasive character such as gravel, sand, clay, etc.

Making Belts Endless at the Factory

Under 10 In. Wide..............	Add Cost of 15 Extra Feet
10 In. Wide and Wider..........	Add Cost of 10 Extra Feet

Prices upon application.

Carrying Capacity of Belt Conveyors

The following table gives the amount of bulk material in tons per hour that can be carried at various speeds on conveyor belts. This is based upon the material weighing 100 pounds per cubic foot, and being fed steadily onto the belt.

Belt Width In.	Largest Pieces	Speed of Conveyor Belt in Feet per Minute				
		50	100	150	200	250
12	2	10	20	30	40	50
14	2½	15	30	45	60	75
16	3	20	40	60	80	100
18	3½	26	52	78	104	130
20	4	31	62	93	124	155
24	6	46	92	138	184	230
30	8	75	150	225	300	375
36	10	105	210	315	420	525
42	12	140	280	420	560	700
48	14	185	370	555	740	925

Belt Width In.	Largest Pieces	Speed of Conveyor Belt in Feet per Minute				
		300	350	400	450	500
12	2	60	....	....	....	....
14	2½	90	....	....	....	....
16	3	120	140	....	....	....
18	3½	156	182	....	....	....
20	4	186	217	248	....	....
24	6	276	322	368	....	....
30	8	450	525	600	675	....
36	10	630	735	840	945	....
42	12	840	980	1120	1260	1400
48	14	1110	1295	1480	1665	1850

NOTE.—The above tonnage table is based upon material which weighs 100 pounds per cubic foot. This would apply to crushed stone as it weighs approximately 100 pounds and for coal, which weighs about 50 pounds, the tonnage capacities would be one-half of those given.

Solid Woven White Cotton Belting

This belting is called "solid woven" because the threads which bind ply on ply are woven into the fabric as one phase of a continuous weaving operation. These binding threads occupy, in the fabric, their own space, and do not displace other threads nor extend quite to the surface of the finished belt, as they are drawn (in the weaving) as tightly as good practice will permit.

The binding threads are as a result not subject to full surface wear, and do not break after the manner of machine stitching. The result is a solid, uniform product which can be woven to any desired width, weight or thickness.

Solid woven is, therefore, to all practical purposes a one-ply belt and the designation by plies is for purposes of comparison, one weight with another. The actual number of plies (given a certain weight and texture) is often a matter of little importance.

Solid woven belting, when water proofed, possesses the ideal power transmitting surface. The solid woven construction provides greater flexibility and elasticity, and consequently a more even pulley contact than is possible with other types of fabric belting.

While these qualities especially apply to water-proof belting when used for power transmission, they are also of great importance when the belt is used for elevators and conveyors without water-proof treatment.

Width Inches	Price, per Running Foot						
	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply	8-Ply	10-Ply
1	$.08	$.12	$.18	$.22	$.27	....	.....
1¼	.09	.13	.20	.25	.30	....	.....
1½	.10	.15	.22	.27	.33	$.45	.....
1¾	.11	.17	.24	.30	.36	.48	.....
2	.12	.18	.26	.32	.39	.50	$.60
2¼	.14	.20	.28	.35	.43	.57	.....
2½	.15	.22	.30	.37	.47	.62	.....
3	.18	.26	.34	.42	.53	.71	.....
3½	.20	.29	.39	.50	.61	.82	.....
4	.23	.32	.43	.56	.67	.90	.....
4½	.26	.36	.48	.63	.77	1.05	.....
5	.28	.40	.53	.69	.84	1.15	.....
5½	.31	.44	.58	.76	.93	1.25	.....
6	.33	.47	.63	.81	1.00	1.33	.....
6½	.37	.53	.69	.90	1.12	1.50	.....
7	.40	.58	.74	.96	1.20	1.60	.....
8	.44	.64	.84	1.08	1.35	1.80	.....
9	.55	.78	1.00	1.30	1.60	2.20	.....
10	.60	.85	1.10	1.45	1.75	2.50	3.15
12	.68	.97	1.27	1.70	2.06	2.90	3.65
14	.84	1.18	1.53	1.98	2.40	3.40	4.25
16	.96	1.35	1.75	2.25	2.70	3.90	4.90
18	1.08	1.53	1.98	2.52	3.05	4.35	5.45
20	1.20	1.70	2.20	2.85	3.40	4.90	6.15
22	1.30	1.85	2.44	3.20	3.85	5.45	6.85
24	1.40	2.00	2.64	3.40	4.10	6.00	7.50
26	1.55	2.30	2.87	3.90	4.60	6.65	8.35
28	1.70	2.50	3.15	4.15	5.00	7.10	8.90
30	1.80	2.65	3.45	4.40	5.40	7.50	9.40
32	2.00	2.95	3.80	4.85	6.00	8.25	10.35
36	2.15	3.20	4.30	5.50	6.65	9.00	11.25
40	2.50	3.60	4.75	6.20	7.45	10.50	13.15
42	2.65	3.80	5.00	6.50	7.75	11.00	13.75
44	2.85	4.10	5.25	6.90	8.20	11.90	14.90
48	3.00	4.30	5.70	7.40	8.85	13.00	16.25

Full rolls are 400 to 500 feet.

Hog Beater Belts

Hog Beater Belt is shipped in 100-foot rolls owing to its thickness. When desired, can be cut to length, punched and cleats attached, for which there is an additional charge.

Endurance

It is made of a heavy, powerful 36-oz. duck of regular folded construction with round edges. It has a heavy coat of rubber between all plies, and gray friction surface. The construction and materials of this belt well adapt it for the severe service in which it has given highly satisfactory results.

Dreadnaught

Made of 36-oz. duck of regular folded construction. Rubber cover both sides and moulded to width, with square edges. This belt is offered when a rubber covered belt is demanded, and gives a good performance.

List Prices on Hog Beater Belts

Size	inches	5	7
10-Ply	per ft.	$2.56	$3.58
12-Ply	per ft.	3.06	4.30
14-Ply	per ft.	3.58	5.00

Chute Lining

Highest qualities of rubber compounds, having extremely high resistance to abrasion. Outlast chute linings of metal and other materials. Unless otherwise specified, made as follows:

Up to ½ Inch Thick—1 ply heavy duck back
½ Inch and Thicker —2 ply heavy duck back

Duck backs are included in overall thickness of lining. Linings with duck back are recommended because the duck imparts qualities of firmness and strength which are highly desirable and advantageous. Condor quality is recommended for ultimate economy. Where materials are light and non-abrasive, International quality will render good service.

Quality	Condor	Master	International
Tensile Strength.lbs.	3500–4000	2500–3000	1400–2000

Prices upon application.

Grader Belts

Available in Master and Manhattan Grades. Master Grade has the same friction and covers as Master conveyor belt. Manhattan Grade has Master conveyor belt friction, and International conveyor belt covers. Manhattan Grade is popular with some users and will render unusual service.

Both Master and Manhattan Grades are furnished with smooth top covers. The use of the tough open-weave breaker strip under the cover which adds greatly to the adhesion of cover to carcass is recommended. Master Grade can also be furnished with a top cover having raised corrugations of ribs running across the belt. The minimum thickness of the rubber cover when the breaker strip is included is 3/32 in.

Corrugated cover prevents the backward sliding of material carried when necessary to operate grader belt at a steep angle. Corrugated cover is ⅛ in. thick over all, including a tough open-weave breaker strip, effectually preventing the tearing and stripping of cover from the duck plies.

Prices upon application.

Dixon's Solid Belt Dressing

For Leather, Rubber and Composition Belts

DIXON'S
SOLID
Belt Dressing

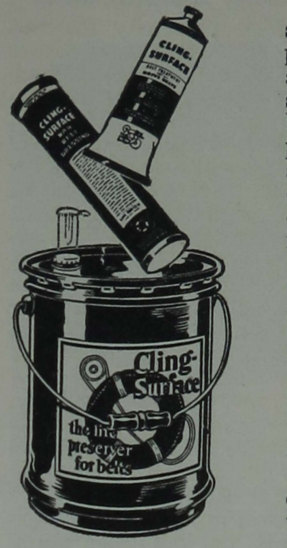
The giant red-labelled bar encased in cardboard cylinder which is simply peeled off as the dressing is used.

Quick and easy to apply; is applied without stopping the machinery. Prevents belt-slip and preserves belt-life.

Length, 8 inches. Diameter, 2 inches.

Per Bar	$.50
Per Case of 25 Bars	10.00

Cling-Surface Belt Preservative



A belt treatment which both preserves drive belts and stops slipping so completely that all belts and rope drives can be run easy or slack under full loads. Makes tight belts unnecessary, permits completely slack operation with attendant large savings in power, lubrication, operating labor, and reduced stress on bearings and shafting.

Lengthens belt life; penetrates to every fibre of the belt; waterproofs; maintains pliability; reduces internal heat and wear during operation. Non-drying; contains no rosin or harmful ingredients. Effective for all types of belts.

Available in liquid form in 4 densities: Heavy, medium, light, and extra light; and in bars. Medium or light density is available in tubes. Light density is recommended for rubber and balata belts and where dust prevails, as in textile, woodworking, etc.

Medium density is recommended for ordinary non-dusty conditions, as in laundries, machine shops, etc.

Heavy density is recommended for belts used in extremely hot temperatures or greatly overloaded.

Extra light density is best for very dusty plants or very cold temperatures.

Liquid in Cans

Container	1-Pt.	1-Qt.	½-Gal.	1-Gal.	3-Gal.	6-Gal.
Each	$.75	1.40	2.25	4.00	*3.90	*3.75

*Furnished in drums, price per gallon.

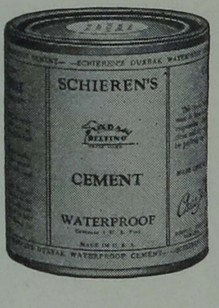
Bars

Size	½	1
Each	$.30	.50

Tubes

Large	$.75
Small	.25

Schieren Duxbak Waterproof Belt Cement



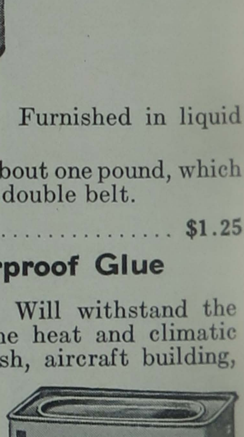
Useful for repair work in general. Furnished in liquid form ready to use.

Each can contains one pint, weight about one pound, which is sufficient to make endless a 10-inch double belt.

Per Pint	$1.25

No. 600 LePage's Waterproof Glue

For wood-jointing and veneering. Will withstand the action of moisture, humidity, extreme heat and climatic changes. It is for outside wood finish, aircraft building, and all sorts of wood gluing problems. A LePage's Waterproof Glue joint is stronger than the wood itself.



The 10-cent size is packed 1 gross to a case; 8 and 16-ounce cans are packed 1 dozen to a case.

10-Cent Size	gross	$14.40
8-oz. Cans	doz.	4.80
16-Oz. Cans	doz.	7.80
5-Lb. Bags	lb.	.55
10-Lb. Bags	lb.	.50
25-Lb. Steel Kegs	lb.	.40
50-Lb. Steel Kegs	lb.	.33

Le Page's Glue

LEPAGE'S
strength
LIQUID GLUE

The quality of Le Page's Liquid Glue is well known. It is always ready for use in all kinds of mending and patching such articles as wood, leather, cloth, etc.

One of the important features of this adhesive material is the can in which it is packed. This is equipped with a patent top, outside friction, easily opened with a screwdriver and when properly put on is perfectly air tight.

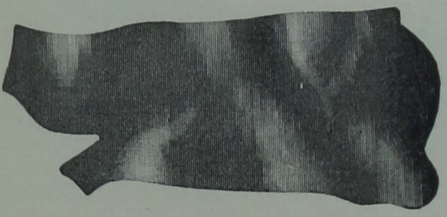
No.	30	31	32	33	35	36
Size Can	1-Gill	½-Pt.	1-Pt.	1-Qt.	1-Gal.	5-Gal.
Each	$.30	.50	.85	1.50	4.50	*4.20

*Price per gallon.

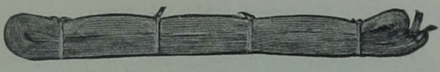
No. 25, Bottles	each	$.20
No. 27, Tubes	each	.20

Lace Leather

Sides and Cut



Side



Cut

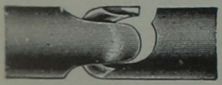
Side Lace

Regular Rawhide	per square foot	.....
Chrome Tanned	per square foot	.....
Indian Tanned	per square foot	.....

Cut Lace

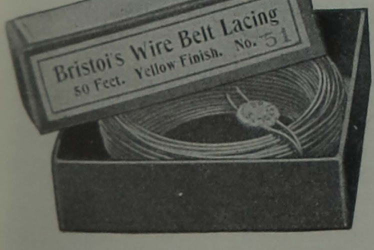
Width ....in.	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4
Per 100 Ft.	$2.00	2.50	3.00	3.75	4.50	5.50	6.50	7.50

Moran's Round Belt Couplings



Size Belt In.	Price per Doz. Pr.	Size Belt In.	Price per Doz. Pr.	Size Belt In.	Price per Doz. Pr.
1/8	$3.00	5/16	$2.50	5/8	$6.00
5/32	3.00	11/32	3.00	11/16	7.50
3/16	2.50	3/8	3.00	3/4	9.00
7/32	2.50	7/16	3.50	7/8	13.00
1/4	2.00	1/2	4.00	1	18.00
9/32	2.50	9/16	5.00	.....	.....

Bristol's Wire Belt Lacing



Has strength and flexibility. Used for fastening ends of belts without a special machine.

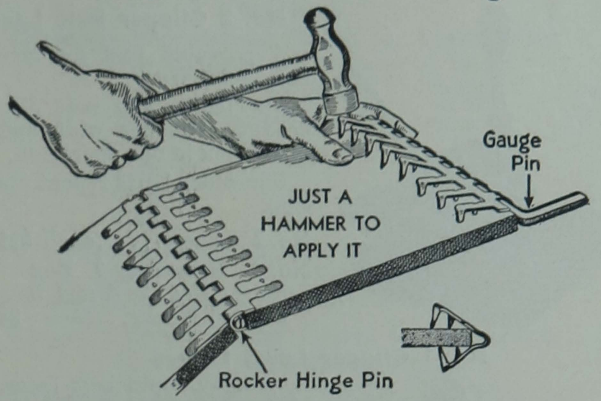
Made in 2 finishes, yellow and white.

Packed 50 feet in a box.

In ordering, specify size number, finish and number of boxes to be furnished.

Size No.	50	51	52	53
Belts Adapted for	Single	Single	Single	Double
Width Belt....in.	2½ & Under	3–5	6–12	6 & Over
Wt. per Box..lbs.	3/10	9/10	10/20	11/20
Price.....per box	$1.00	1.00	1.00	1.00

Alligator Steel Belt Lacing



For use on leather, rubber, balata, stitched canvas or solid woven belting, giving a smooth, flexible joint; also for general service, high speed and heavy duty.

Efficient separable hinge lacing of extreme strength. Protects ends of fabric belts. Operates successfully with an idler or on serpentine drives. No tool required but a hammer.

Packed in boxes complete with gage and hinge pins.

Lacing No.	Per Box	Contents No. Sets	Contents For Size Belts, In.	Thickness of Belt Inches
00	$1.40	6	6	Up to 1/16
1	1.60	6	6	1/16 to 3/32
5	1.80	6	6	3/32 to 1/8
15	1.90	4	12	1/8 to 5/32
20	2.00	4	12	5/32 to 3/16
25D	2.50	4	12	3/16 to 7/32
25F	2.50	6	8	3/16 to 7/32
25G	5.00	8	12	3/16 to 7/32
27K	2.65	4	12	1/4 to 9/32
27L	5.30	8	12	1/4 to 9/32
35M	2.30	4	8	9/32 to 5/16
35N	3.40	4	12	9/32 to 5/16
45U	4.50	4	12	5/16 to 3/8
55W	5.20	4	12	3/8 to 7/16
65X	6.00	4	12	7/16 to 1/2
75	8.80	4	12	1/2 to 5/8

Corrugated pins supplied regularly with Nos. 00, 1 and 5 Alligator tape fasteners.

Sectional steel rocker hinge pins supplied regularly with Nos. 15 to 75, inclusive, for transmission service.

Rawhide hinge pins supplied with Nos. 00 to 45, inclusive, only upon request.

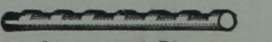
S Packages

Each package contains two 6-inch sets of lacing complete with gage and hinge pins.

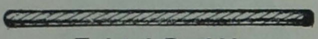
Packed in cartons, 10 packages of a single size to the carton.

Size No.	15S	20S	25S	27S	35S
Per Carton	$5.50	6.25	7.00	7.50	9.50

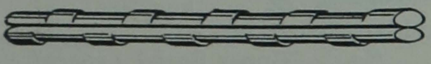
Extra Hinge Pins
Cut to Suit Requirements



Corrugated Pin
For Nos. 00 to 75 Inclusive



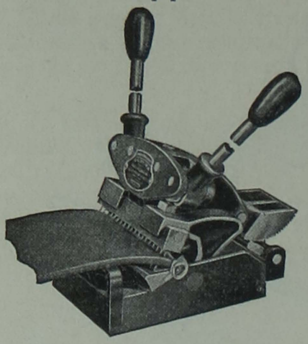
Twisted Rawhide
For Nos. 00 to 45 Inclusive



Rocker Hinge Pin
For Nos. 15 to 75 Inclusive

Description	Per Doz.	For Lacing No.	Length Pins In.
Corrugated Wire or Rawhide Pins	$.40	00	6
Corrugated Wire or Rawhide Pins	.40	1	6
Corrugated Wire or Rawhide Pins	.40	5	6
Rocker, Corrugated or Rawhide Pins	.90	15	12
Rocker, Corrugated or Rawhide Pins	.90	20	12
Rocker, Corrugated or Rawhide Pins	.90	25	12
Rocker, Corrugated or Rawhide Pins	1.00	27	12
Rocker, Corrugated or Rawhide Pins	1.00	35	12
Rocker, Corrugated or Rawhide Pins	1.20	45	12
Rocker or Corrugated Pins Only	1.40	55–65	12
Rocker or Corrugated Pins Only	1.70	75	12

Clipper Belt Lacing Machines



No. 3 Clipper Belt Lacers

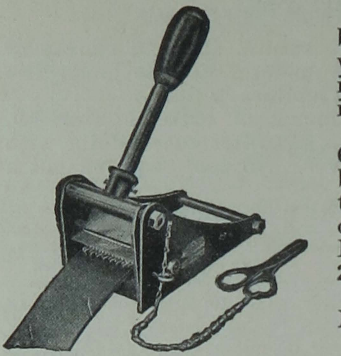
A portable tool for general belt lacing work.

For lacing any belt not exceeding 6 inches wide and 3/8 inch thick in one operation.

For wider belts repeat operation.

No. **3**, Lacer.......each **$25.00**
No. **3**, Including 1 Box Each, Nos. 3, 4 and 5 Carded Hooks...each **28.15**

No. 1 Clipper Lever Lacers

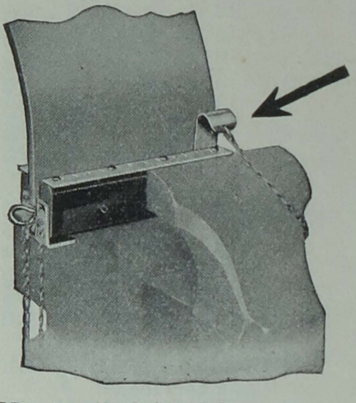


A very rapid belt lacer for belts not more than 2 inches wide and not exceeding 3/16 inch thick. Also made in 2-inch vise model.

No. 1 hooks are carded in 6-inch lengths, 20 cards per box, sufficient for lacing 34 two-inch or 77 one-inch belts complete.

No. **1**, Lacer.....each **$10.00**
2-Inch Vise Model ....each **2.50**
No. **1**, Clipper Belt Hooks.......per box **.95**

No. 0 Clipper Vise Lacers

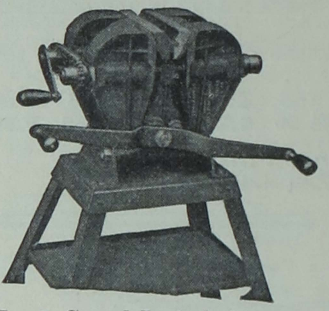


Has a special pressure plate as indicated by arrow, which makes it possible to embed the hooks flush with the surface of the belt, also to clinch the points.

The 4-inch model laces belts up to 4 inches wide and not exceeding 3/8 inch thick in one operation. The 6-inch model laces belts up to 6 inches wide and not exceeding 3/8 inch thick in one operation.

No. **0**, 4-Inch Model..........................each **$3.00**
No. **0**, 6-Inch Model..........................each **3.50**

No. 8 Clipper Speed Lacers



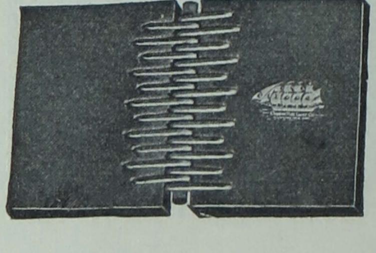
Will lace any belt 8 inches wide in one operation. For wider belts repeat operation. A three-quarter turn of the double end crank will embed the hooks flush with the surface of any belt and clinch the points. The clinch keeps the hooks from working up and becoming worn or crystallized by pounding on the pulleys which often causes breakage.

No. **8**, Stand Included.......................each **$115.00**

No. 6 Clipper Speed Lacers

Similar to the No. 8 model but smaller. Laces all belts up to and including 6 inches wide in one operation. It will do the job perfectly. For wider belts repeat the operation. Suitable for all belts up to 3/8 inch thick.

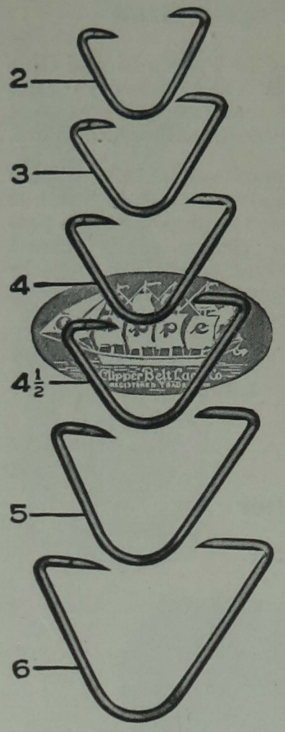
No. **6**, Stand Included.......................each **$75.00**



The Clipper Joint

A smooth, flexible, durable joint that will not tear nor pull out. Easily and rapidly applied.

Suitable for every kind of belting—balata, fabric, leather, rubber, etc.—not exceeding 3/8 inch in thickness.



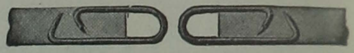
Actual Size

Clipper Belt Lacing

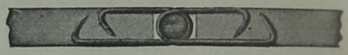
No Exposed Hook Points

Clipper belt lacing makes an ideal hinge joint, flexible as the belt itself. The hooks are made from a special steel wire of an analysis that combines great tensile strength with rigidity and wearing qualities, capable of standing a strain of over 400 pounds per inch. The ends of the belt are held in a firm grip. No two hook points enter the belt directly opposite, so no belt fibres are broken.

Suitable for every kind of belting—balata, fabriç, leather, rubber, etc., not exceeding 3/8 inch in thickness.



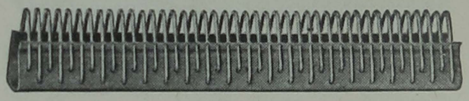
Cross Section of Embedded Hook Before Joining



Joined

The secret of the success of Clipper Hooks lies in their design and in the manner in which one hook is placed behind the other as shown in the illustration. While a powerful grip is thus secured, no belting fibers are cut or injured. The belt is not weakened at the joint.

Clipper Belt Hooks



Carded on paper for convenience in handling. The cards can be cut, without waste, to suit the width required for any belt. Each card hold 84 hooks.

Packed in boxes containing 12 cards (one size) and rawhide pins—sufficient for lacing both ends of belt, total width 80 inches.

Selection of size is determined by the thickness of the belt.

No.	For	Per Box
2	Thin Belts Over Small Sized Pulley	$.95
3	Thin Belts Over Medium Sized Pulley	1.00
4	Belts Not Over 1/4 Inch Thick	1.00
4½	For Heavy Duty Belts 1/4 Inch Thick	1.15
5	Belts Not Over 5/16 Inch Thick	1.15
6	Belts Not Over 3/8 Inch Thick	1.50

Add $1.00 per box for rust-proof hooks; for Nos. 4½, 5 and 6 add $1.25 per box.

Twisted Rawhide and Special Pins

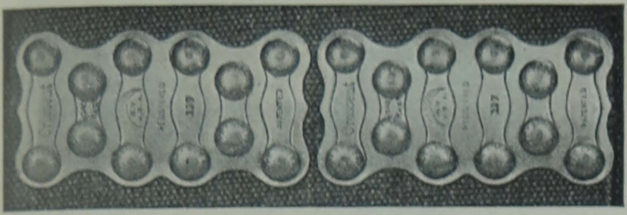
Twisted rawhide pins are for general requirements.

Specials are especially well adapted for use in places where moisture prevails.

Packed in standard package containing 24 pins, 12 inches long.

Size No.	Diam. In.	For	Per Package Rawhide	Per Package Special
13	3/32	Nos. 1, 2 and 3 Hooks	$.85	$.70
12	7/64	Nos. 4 and 4½ Hooks	.85	.70
11	1/8	No. 5 Hooks	.85	.70
10	9/64	No. 5 Hooks	.95	.80
9	5/32	No. 6 Hooks	1.05	.90
8	11/64	No. 6 Hooks	1.15	1.00
7	3/16	Heavy Belts	1.45	1.20
5	7/32	Heavy Belts	2.00	1.60
Assorted Sizes, Nos. 8 to 13			.90	.75

Crescent Belt Fasteners

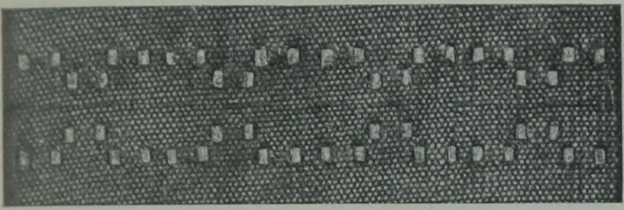


Outside of Crescent Joint

Crescent Plates are curved to fit the diameter of pulley for which they are intended. Patent roller edge prevents breaking back of joint. Nothing to pry up, fly off or work loose.

Cross Section

Crescent Rivets find their way through belt without cutting or severing lengthwise fibre. The clinch sinks below the surface of the belt. No wear nor noise. Crescent Belt Fasteners will outlast the belt.



Pulley Side of Crescent Joint

The strain is evenly distributed across the entire width of belt. Crescent joining is as smooth as endless on pulley side. Belt ends are butted tightly together. No gap to catch on shifter or guide.

Service Chart

Crescent Short-Grip Plates for Light Work

Smaller Pulley 3-Inch Diameter or Larger

No.	Per Gross	For Belt Widths Inches	Crescent Rivets Required	Weight Pounds per Gross
25	$2.88	¾–1	2	1¾
45	5.76	1½	4	3¼
65	8.64	2	6	4½
85	11.52	2½	8	5½
805	11.52	3	8	6½

Crescent Medium-Grip Plates for General Work

Smaller Pulley 6-Inch Diameter or Larger

67	$8.64	1½	6	6
607	8.64	2	6	7½
87	11.52	2½	8	9½
107	14.40	3	10	11¼
127	17.28	3½	12	15¼
147	20.16	4	14	16½

Crescent Special-Grip Plates for General Work

Smaller Pulley 9-Inch Diameter or Larger

63	$11.52	2	6	10½
83	14.40	2½	8	12½
103	17.28	3	10	16½
123	20.16	3½	12	20½

Crescent Long-Grip Plates for Heavy Work

Smaller Pulley 12-Inch Diameter or Larger

109	$17.28	2½	10	21½
149	23.04	3	14	24½
1409	25.92	3½	14	30½
189	28.80	4	18	34½

For wider belts use 2 or more Crescent Plates.

Crescent Large Shank Rivets for Attaching Above Crescent Plates

Use a size 3/16 inch longer than thickness of belt.

No.	Per Gross	Lgth. In.	Wt., Oz. per Gross	No.	Per Gross	Lgth. In.	Wt., per Gross Lbs.	Wt., per Gross Oz.
L5	$.70	5/16	10	L10	$.90	10/16	1	.
L6	.70	6/16	11	L11	1.00	11/16	1	1
L7	.80	7/16	12	L12	1.00	12/16	1	2
L8	.80	8/16	14	L13	1.10	13/16	1	3
L9	.90	9/16	15	L14	1.10	14/16	1	4

Crescent Belt Fasteners

Continued

Crescent High-Speed Plates for Light Work

Smaller Pulley 2-Inch Diameter or Larger

No.	Per Gross	For Belt Widths Inches	Crescent Rivets Required	Weight Pounds per Gross
20	$2.88	½–¾	2	1¼
40	5.76	1	4	1½
44	5.76	1¼	4	2¼
60	8.64	2	6	3½

Smaller Pulley 4¼-Inch Diameter or Larger

66	$8.64	1½	6	4

For wider belts use 2 or more Crescent Plates.

Crescent Small Shank Rivets for Attaching Crescent High-Speed Plates

Use a size 3/16 inch longer than thickness of belt.

No.	Per Gross	Lgth. In.	Wt., Oz. per Gross	No.	Per Gross	Lgth. In.	Wt., Oz. per Gross
S5	$.50	5/16	6	S 8	$.55	8/16	8
S6	.50	6/16	6½	S 9	.60	9/16	9
S7	.55	7/16	7	S10	.60	10/16	10

Crescent Jumbo Plates for Extra Heavy Work

Smaller Pulley 24-Inch Diameter or Larger

No.	Per Gross	For Belt Widths Inches	Crescent Rivets Required	Weight Pounds per Gross
1011	$23.04	2	10	22½
1611	28.80	3	16	37½
2211	34.56	4	22	51½

For wider belts use 2 or more Crescent Plates.

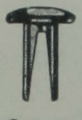
For conveyor or elevator work where belt runs at a comparatively slow speed, Crescent Jumbo Plates can be used where smaller pulley is 18 inches diameter or larger.

Crescent Jumbo Rivets for Attaching Crescent Jumbo Plates

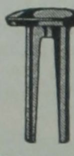
Use a size 5/16 inch longer than thickness of belt.

No.	Per Gross	Length Inches	Weight per Gross Lbs.	Weight per Gross Oz.	No.	Per Gross	Length Inches	Weight per Gross Lbs.	Weight per Gross Oz.
J10	$1.25	10/16	1	9	J14	$1.55	14/16	1	14
J11	1.40	11/16	1	11	J15	1.70	15/16	1	15
J12	1.40	12/16	1	12	J16	1.70	16/16	2	..
J13	1.55	13/16	1	13	J18	1.85	18/16	2	4

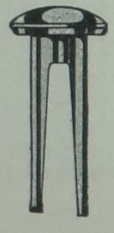
Crescent Rivets



S6 Crescent Small Shank Rivet



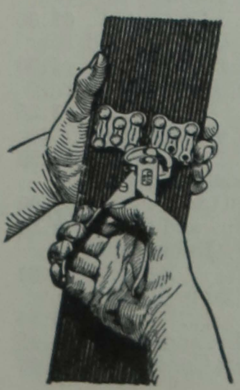
L9 Crescent Large Shank Rivet



J14 Crescent Jumbo Rivet

Crescent Rivets are of special construction, size and proportion especially adapted for this work. They are made in 3 styles as shown and in various lengths as indicated in the different tables.

Packed 1 gross of 1 size to a box.



No. 79 Crescent Extractors

To shorten or disconnect with a Crescent Rivet Extractor remove the Crescent Rivets from one side of the joint only. Cut out slack and rejoin, using a few new Crescent Rivets.

The Crescent Plates and half the Crescent Rivets are undisturbed and good for the life of the belt.

Crescent Rivet Extractor is a specially designed tool for removing Crescent Rivets quickly and easily.

Length, 8 inches.

Weight, 1 pound.

No. 79..................each **$1.00**

Bristol's Steel Belt Lacing

No. 00

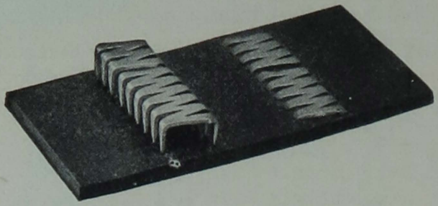
No. 100

No. 1100

This belt lacing is cut from especially prepared cold rolled steel strips. By its use, belts can be quickly and easily joined without the use of special tools.

Made in three styles and various sizes.

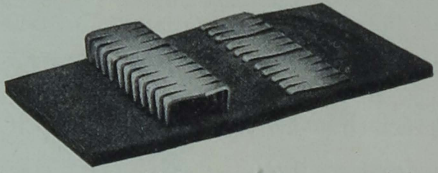
No. 1 Style for Leather Belts



Packed in assorted widths, each box containing enough to lace 100 inches in width of belts.

Size No.	Thickness Belt, Inches	Kind of Belt	Per Box
00	1/16 to 1/8	Split and Extra Light	$1.00
0	1/8 to 3/16	Split and Light	1.00
1	3/16 to 1/4	Single	1.50
2	1/4 to 5/16	Extra Heavy and Wide Single	2.00
3	5/16 to 3/8	Double	2.50
4	3/8 to 7/16	Heavy Double	3.00
5	7/16 to 9/16	Extra Heavy Double	3.50

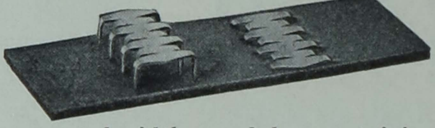
No. 11 Style for Woven Belts



Packed in assorted widths, each box containing enough to lace 100 inches in width of belts.

Size No.	Thickness Belt, Inches	Kind of Belt	Per Box
100	1/16 to 1/8	Lightest Rubber and Cotton	$1.00
10	1/8 to 3/16	2-Ply Rubber and Cotton	1.00
11	3/16 to 1/4	3-Ply Rubber and Cotton	1.50
12	1/4 to 5/16	4-Ply Rubber and Cotton	2.00
13	5/16 to 3/8	5-Ply Rubber and Cotton	2.50
14	3/8 to 7/16	6-Ply Rubber and Cotton	3.00
15	7/16 to 9/16	7-Ply Rubber and Cotton	3.50
17	1/2 to 5/8	8-Ply Rubber and Cotton	4.95
19	11/16 to 13/16	10-Ply and Extra Heavy Conveyor	6.05

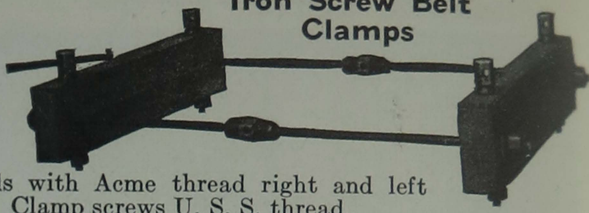
Staggered Point Style for All Kinds of Belts



Packed in assorted widths, each box containing enough to lace 100 inches in width of belts.

Size No.	Thickness Belt, Inches	Kind of Belt	Per Box
1100	1/16 to 1/8	Split Leather, Light Rubber and Cotton	$1.00
110	1/8 to 5/32	Split Leather, Light Rubber and Cotton	1.00
110½	5/32 to 1/4	Single Leather, 2-Ply Rubber and Cotton	1.25
111	3/16 to 1/4	Single Leather, 3-Ply Rubber and Cotton	1.50
112	1/4 to 5/16	Ex. Hy. and Wide Single Leather, 4-Ply Rubber and Cotton	2.00
113	5/16 to 3/8	Dbl. Leather, 5-Ply Rbr. and Cot.	2.50
114	3/8 to 7/16	Hy. Dbl. Leather, 6-Ply Rubber and Cotton	3.00
115	7/16 to 9/16	Ex. Hy. Dbl. Leather, 7-Ply Rubber and Cotton	3.50
117	1/2 to 5/8	Conveyor and 8-Ply Rbr. and Cot.	4.95
119	5/8 to 13/16	10-Ply and Extra Heavy Conveyor	6.05

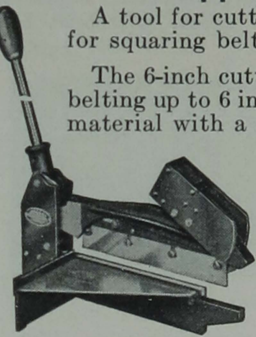
Iron Screw Belt Clamps



Rods with Acme thread right and left hand. Clamp screws U. S. S. thread.

		Standard Length Rods				Extra Long Rods		
No.	Belt	No. Acme Threads per Inch	Length Rods Inches	Wt. Lbs.	Each	Length Rods Inches	Wt. Lbs.	Each
270	14	6	36	48	$15.00	60	54	$20.00
271	18	6	44	65	17.50	68	77	22.50
272	24	5	54	90	22.50	90	102	30.00
273	36	5	66	190	45.00	102	202	52.50
274	48	4½	96	300	80.00	...	...	.....
275	60	3½	120	475	125.00	...	...	.....
276	72	3	120	850	175.00	...	...	.....

Clipper Belt Cutters



A tool for cutting belting from the roll as well as for squaring belt ends preparatory to lacing them.

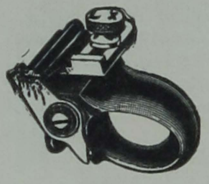
The 6-inch cutter will cut and square all makes of belting up to 6 inches in width, even of the toughest material with a slight pressure on the handle; it is also satisfactory for cutting brake lining; 10-inch cutter up to 10 inches in width.

The knife cannot be raised high enough to become a hazard.

Weight of 6-inch with open end, 11 pounds; 10-inch open end, 16 pounds.

6-Inch Open End Cutter	each	$15.00
10-Inch Open End Cutter	each	20.00
Belt Cutter Blades, 10-Inch Capacity	each	2.75
Belt Cutter Blades, 6-Inch Capacity	each	1.50

Elliott Patent Lace Cutters

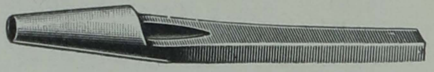


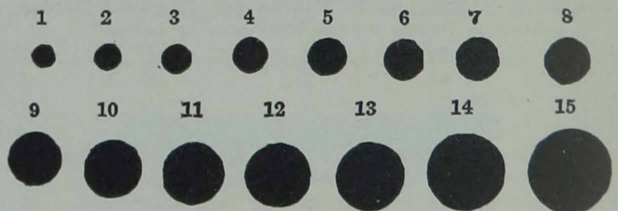
May be adjusted to cut any width lacing from 3/16 to 3/4 inch.

Cutters	per dozen	$7.50
Extra Blades	per dozen	2.50

Round Belt Punches

With Square Shank





Actual Sizes of Holes

Size No.	1 to 6	7 to 9	10 to 12	13 to 14	15 to 17
Per Dozen	$3.20	3.70	5.40	9.30	10.80

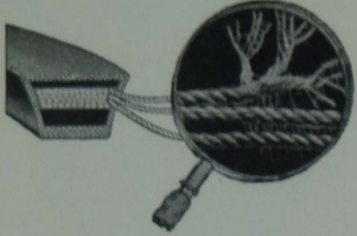
No. 19 Kraeuter Revolving Belt Punches

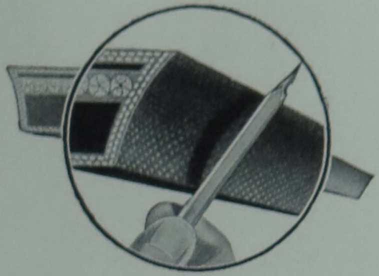
KRAEUTER&CO.
FORGED STEEL

Kraeuter finish. Forged steel. Knurled handles. Length, 8¾ inches. Has 6 tubes. Gauge No. of tubes are 4, 5, 6, 7, 8 and 9.

No. 19	each	$1.95

Gates Light Duty V-Belts





As an ordinary V-belt bends around a pulley, the sidewalls bulge out. The bulged-out sidewalls cannot fit the straight pulley sides, and excessive wear against the sides of the pulley results.

Gates belts will bulge also, but sidewalls have been molded concave and bulge causes sides of belt to straighten and fit sides of pulley.

The problem of excessive wear due to bulge is solved by correct-fitting concave sidewall V-belts.

In an ordinary belt where only dry cotton cords are used, the bending and straightening of the belt tend to tear the dry cotton cords loose from the rubber surrounding them and cause the belt to separate and break.

Every cord that goes into a Gates belt is first filled to the core with pure liquid rubber (Latex). Every fiber is surrounded with a coating of this rubber.

When these rubber-filled cords are put in the center of a Gates belt and vulcanized to the rubber surrounding them, they are permanently welded there; can never work loose; that is why separation of cords from rubber is impossible.

No. 1—$^{13}/_{32}$x$^{7}/_{32}$ Inch

Belt No.	Each	Outside Circum.	Belt No.	Each	Outside Circum.	Belt No.	Each	Outside Circum.	Belt No.	Each	Outside Circum.	Belt No.	Each	Outside Circum.
1110	$.98	11.0	1210	$.98	21.0	1285	$1.07	28.5	1350	$1.23	35.0	1410	$1.42	41.0
1130	.98	13.0	1220	.98	22.0	1290	1.07	29.0	1360	1.27	36.0	1430	1.50	43.0
1150	.98	15.0	1230	.98	23.0	1300	1.09	30.0	1370	1.30	37.0	1450	1.55	45.0
1170	.98	17.0	1250	.98	25.0	1310	1.12	31.0	1380	1.32	38.0	1470	1.59	47.0
1190	.98	19.0	1255	1.00	25.5	1330	1.18	33.0	1390	1.35	39.0	1580	1.92	58.0
1200	.98	20.0	1270	1.02	27.0	1340	1.21	34.0	1400	1.38	40.0	1610	2.01	61.0

No. 2—$^{33}/_{64}$x$^{9}/_{32}$ Inch

2170	$1.02	17.0	2300	$1.14	30.0	2420	$1.52	42.0	2600	$2.06	60.0	2780	$2.62	78.0
2180	1.02	18.0	2310	1.17	31.0	2430	1.56	43.0	2620	2.12	62.0	2800	2.70	80.0
2200	1.02	20.0	2320	1.20	32.0	2440	1.60	44.0	2640	2.18	64.0	2820	2.73	82.0
2210	1.02	21.0	2330	1.23	33.0	2460	1.64	46.0	2655	2.24	65.5	2840	2.76	84.0
2220	1.02	22.0	2340	1.26	34.0	2468	1.67	46.8	2670	2.27	67.0	2870	2.83	87.0
2230	1.02	23.0	2350	1.29	35.0	2480	1.70	48.0	2680	2.30	68.0	2880	2.86	88.0
2240	1.02	24.0	2360	1.32	36.0	2500	1.76	50.0	2690	2.33	69.0	2920	2.94	92.0
2250	1.02	25.0	2370	1.35	37.0	2520	1.82	52.0	2700	2.36	70.0	2940	3.00	94.0
2260	1.04	26.0	2380	1.38	38.0	2530	1.85	53.0	2710	2.39	71.0	2960	3.06	96.0
2270	1.06	27.0	2390	1.41	39.0	2540	1.88	54.0	2720	2.42	72.0	2980	3.12	98.0
2280	1.08	28.0	2400	1.44	40.0	2560	1.94	56.0	2740	2.48	74.0	21000	3.20	100.0
2290	1.11	29.0	2405	1.48	40.5	2580	2.00	58.0	2760	2.54	76.0	....	....	....

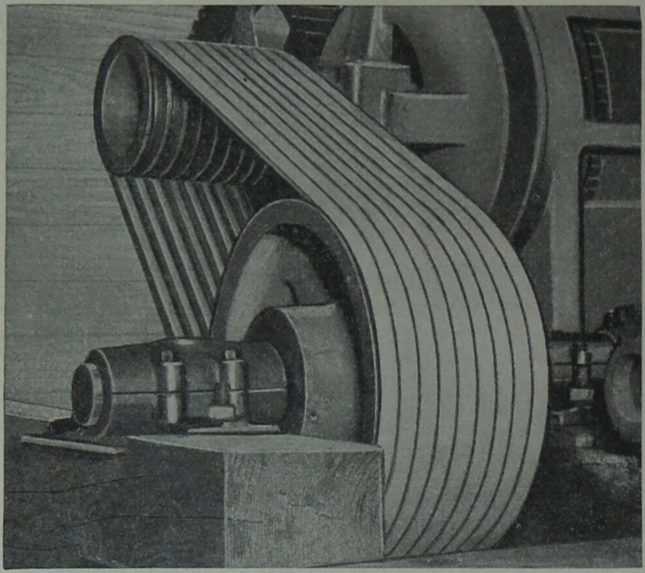
No. 3—$^{11}/_{16}$x$^{11}/_{32}$ Inch

3250	$1.20	25.0	3355	$1.65	35.5	3460	$2.16	46.0	3590	$2.77	59.0	3720	$3.40	72.0
3260	1.25	26.0	3360	1.65	36.0	3470	2.20	47.0	3600	2.83	60.0	3740	3.48	74.0
3270	1.29	27.0	3370	1.70	37.0	3480	2.25	48.0	3620	2.94	62.0	3760	3.57	76.0
3280	1.33	28.0	3380	1.74	38.0	3490	2.30	49.0	3630	2.98	63.0	3780	3.68	78.0
3290	1.37	29.0	3390	1.78	39.0	3500	2.35	50.0	3640	3.02	64.0	3800	3.78	80.0
3300	1.42	30.0	3400	1.84	40.0	3510	2.39	51.0	3650	3.06	65.0	3840	3.98	84.0
3310	1.45	31.0	3410	1.90	41.0	3520	2.44	52.0	3660	3.10	66.0	3880	4.12	88.0
3320	1.48	32.0	3420	1.96	42.0	3540	2.53	54.0	3670	3.15	67.0	3920	4.28	92.0
3330	1.52	33.0	3430	2.02	43.0	3550	2.57	55.0	3680	3.20	68.0	3930	4.32	93.0
3340	1.56	34.0	3440	2.08	44.0	3560	2.62	56.0	3700	3.30	70.0	3960	4.44	96.0
3350	1.60	35.0	3450	2.12	45.0	3575	2.72	57.5	3710	3.35	71.0	31000	4.64	100.0

No. 4—$^{15}/_{16}$x$^{7}/_{16}$ Inch

4380	$2.40	38.0	4540	$3.58	54.0	4640	$4.30	64.0	4740	$5.00	74.0	41000	$6.72	100.0
4460	3.00	46.0	4550	3.63	55.0	4660	4.46	66.0	4790	5.38	79.0	.....	....	.....
4480	3.10	48.0	4560	3.68	56.0	4680	4.58	68.0	4850	5.77	85.0	.....	....	.....
4500	3.24	50.0	4580	3.80	58.0	4700	4.72	70.0	4890	6.05	89.0	.....	....	.....
4520	3.42	52.0	4620	4.14	62.0	4720	4.84	72.0	4940	6.36	94.0	.....	....	.....

Gates Vulco Rope V-Drives



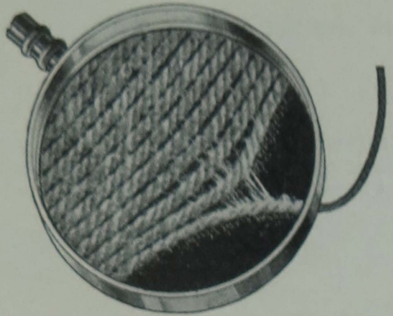
Necessary Data for Ordering Gates Vulco Ropes When Belt Number Is Not Known

Type of equipment to be driven (ice machine, grinder, compressor, etc.).
Type of power used (electric motor, Diesel engine, gasoline engine, etc.).
Outside diameter of driver pulley now being used.
Width of face of driver pulley now being used.
Outside diameter of driven pulley now being used.
Width of face of driven pulley now being used.
Maximum outside diameter of driver sheave that can be used.
Minimum outside diameter of driven sheave that can be used.
Speed or r.p.m. of motor or driving shaft (actual load speed).
Diameter of shaft and size of keyway on motor or driving shaft.
Speed or r.p.m. of driven shaft.
Diameter of shaft and size of keyway on driven shaft.
H.P. rating of motor or engine to be used.
Actual maximum h.p. required by driven unit (if available).
Shaft centers: Maximum shaft center distance that can be used; minimum shaft center distance that can be used; preferred distance between shaft centers.
Send sketch of drive.
How many of above drives required.

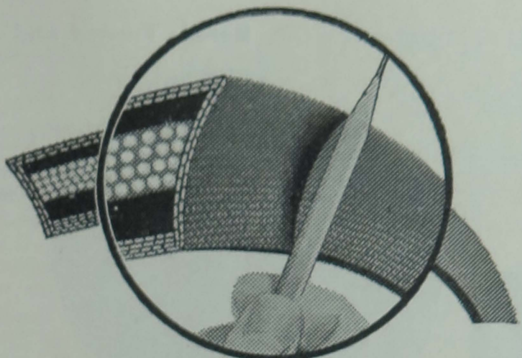
Comparative Table—Interchangeable Belt Sizes

Gates Vulco Rope	Dodge D-V	Worthington Goodyear	A-C Texrope	Dayton Cog-belt	Fairbanks-Morse Flexmoor	Gilmer	Manhattan Condor	Browning Grip-Belt
26A	A26	0270	26A	2A8	....	2A6	A26	A26
31A	A31	0320	31A	3A3	....	3A1	A31	A31
35A	A35	0360	35A	3A7	1-A	3A5	A35	A35
38A	A38	0390	38A	4A0	....	3A8	A38	A38
42A	A42	0430	42A	4A4	2-A	4A2	A42	A42
46A	A46	0470	46A	4A9	....	4A6	A46	A46
51A	A51	0520	51A	5A4	3-A	5A1	A51	A51
60A	A60	0610	60A	6A3	4-A	6A0	A60	A60
68A	A68	0690	68A	7A1	....	6A8	A68	A68
75A	A75	0760	75A	7A8	5-A	7A5	A75	A75
80A	A80	0810	80A	8A3	6-A	8A0	A80	A80
85A	A85	0860	85A	8A8	....	8A5	A85	A85
90A	A90	0910	90A	9A3	7-A	9A0	A90	A90
96A	A96	0970	96A	9A9	....	9A6	A96	A96
105A	A105	01060	105A	1A08	8-A	1A05	A105	A105
112A	A112	01130	112A	1A15	....	1A12	A112	A112
120A	A120	01210	120A	1A23	9-A	1A20	A120	A120
128A	A128	01290	128A	1A31	....	1A28	A128	A128
35B	B35	1364	35B	3B7	1-B	3B5	B35	B35
38B	B38	1394	38B	4B0	2-B	3B8	B38	B38
42B	B42	1434	42B	4B4	3-B	4B2	B42	B42
46B	B46	1474	46B	4B9	4-B	4B6	B46	B46
51B	B51	1524	51B	5B4	5-B	5B1	B51	B51
55B	B55	1564	55B	5B9	....	5B5	B55	B55
60B	B60	1614	60B	6B3	6-B	6B0	B60	B60
68B	B68	1694	68B	7B1	7-B	6B8	B68	B68
75B	B75	1764	75B	7B8	8-B	7B5	B75	B75
81B	B81	1824	81B	8B4	....	8B1	B81	B81
85B	B85	1864	85B	8B8	9-B	8B5	B85	B85
90B	B90	1914	90B	9B3	10-B	9B0	B90	B90
97B	B97	1989	97B	9B9	11-B	5478	B97	B97
105B	B105	11064	105B	1B08	12-B	1B05	B105	B105
112B	B112	11139	112B	1B15	13-B	5485	B112	B112
120B	B120	11214	120B	1B23	14-B	1B20	B120	B120
128B	B128	11294	128B	1B31	15-B	1B28	B128	B128
144B	B144	11454	144B	1B47	16-B	1B44	B144	B144
158B	B158	11594	158B	1B61	17-B	1B58	B158	B158
173B	B173	11744	173B	1B76	18-B	1B73	B173	B173
180B	B180	11814	180B	1B84	19-B	1B80	B180	B180
195B	B195	11964	195B	1B99	....	1B95	B195	B195
210B	B210	12114	210B	2B14	....	2B08	B210	B210
240B	B240	12400	240B	2B44	20-B	2B38	B240	B240
270B	B270	12700	270B	2B74	....	2B68	B270	B270
300B	B300	13000	300B	3B04	21-B	2B98	B300	B300
51C	C51	2530	51C	5C4	1-C	5C1	C51	C51
60C	C60	2620	60C	6C3	2-C	6C0	C60	C60
68C	C68	2700	68C	7C1	....	6C8	C68	C68
75C	C75	2770	75C	7C8	3-C	7C5	C75	C75
81C	C81	2830	81C	8C4	4-C	8C1	C81	C81
85C	C85	2870	85C	8C8	....	8C5	C85	C85
90C	C90	2920	90C	9C3	5-C	9C0	C90	C90
96C	C96	2980	96C	9C9	6-C	9C6	C96	C96
105C	C105	21070	105C	1C08	7-C	1C05	C105	C105
112C	C112	21140	112C	1C15	....	1C12	C112	C112
120C	C120	21220	120C	1C23	8-C	1C20	C120	C120
128C	C128	21300	128C	1C31	9-C	1C28	C128	C128
144C	C144	21460	144C	1C47	10-C	1C44	C144	C144
158C	C158	21600	158C	1C61	....	1C58	C158	C158
162C	C162	21640	162C	1C65	....	1C62	C162	C162
173C	C173	21750	173C	1C76	....	1C73	C173	C173
180C	C180	21820	180C	1C84	11-C	1C80	C180	C180
195C	C195	21970	195C	1C99	....	1C95	C195	C195
210C	C210	22130	210C	2C14	12-C	2C08	C210	C210
240C	C240	22400	240C	2C44	13-C	2C38	C240	C240
270C	C270	21700	270C	2C74	14-C	2C68	C270	C270
300C	C300	23000	300C	3C04	15-C	2C98	C300	C300
330C	C330	23300	330C	3C34	....	3C28	C330	C330
360C	C360	23600	360C	3C64	....	3C58	C360	C360
420C	C420	.....	420C	.....	....	.....	.....	.....
120D	D120	31224	120D	1D23	1-D	1D20	D120	D120
128D	D128	31304	128D	1D31	2-D	1D28	D128	D128
144D	D144	31464	144D	1D47	3-D	1D44	D144	D144
158D	D158	31604	158D	1D61	....	1D58	D158	D158
162D	D162	31644	162D	1D65	....	1D62	D162	D162
173D	D173	31754	173D	1D76	....	1D73	D173	D173
180D	D180	31824	180D	1D84	4-D	1D80	D180	D180
195D	D195	31976	195D	1D99	....	1D95	D195	D195
210D	D210	32131	210D	2D14	5-D	2D08	D210	D210
240D	D240	32400	240D	2D44	6-D	2D38	D240	D240
270D	D270	32700	270D	2D74	7-D	2D68	D270	D270
300D	D300	33000	300D	3D04	8-D	2D98	D300	D300
330D	D330	33300	330D	3D34	9-D	3D28	D330	D330
360D	D360	33600	360D	3D64	10-D	3D58	D360	D360
420D	D420	34200	420D	.....	11-D	4D18	D420	D420
480D	D480	34800	480D	.....	12-D	4D78	D480	D480
540D	D540	35400	540D	.....	....	5D38	D540	D540
600D	D600	36000	600D	.....	13-D	5D98	D600	D600
660D	D660	36600	660D	.....	14-D	.....	.....	.....
180E	E180	41831	180E	1E84	1-E	1E80	E180	E180
195E	E195	41985	195E	1E99	....	1E95	E195	E195
210E	E210	42136	210E	2E14	2-E	2E08	E210	E210
240E	E240	42400	240E	2E44	3-E	2E38	E240	E240
270E	E270	42700	270E	2E74	4-E	2E68	E270	E270
300E	E300	43000	300E	3E04	5-E	2E98	E300	E300
330E	E330	43300	330E	3E24	....	3E28	E330	E330
360E	E360	43600	360E	3E64	6-E	3E58	E360	E360
420E	E420	44200	420E	.....	7-E	4E18	.....	.....
480E	E480	44800	480E	.....	8-E	4E78	.....	.....
540E	E540	45400	540E	.....	9-E	5E38	.....	.....
600E	E600	46000	600E	.....	10-E	5E98	.....	.....
660E	E660	46600	660E	.....	11-E	.....	.....	.....
.....	.....	.....	.....	.....	....	.....	.....	.....

Gates Vulco Ropes



How Latex Bonds, Cords and Fibres



A Pencil Placed Against Side Shows Concave Feature

Concave Side Walls.—All Gates Vulco Ropes are molded with concave sidewalls and this construction insures a uniformly distributed pressure between the sidewalls of the belt and the sides of the groove as the belt bends around the sheave. More h.p. is transmitted at a lower belt tension and sidewall wear is distributed over all the sidewall surface.

Latexed Cords.—The latexing process increases the elasticity and strength of the cords and prevents them from chafing as the belt bends around the pulleys. Latex cords are responsible for the long life of Gates Vulco Ropes in the most severe service.

Bias Cut Cover.—A strong, flexible, wear-resisting cover of bias cut fabric protects the core of every Gates Vulco Rope from dirt and water and ply separation.

Standard Sizes

A—33/64x9/32 Inch				B—11/16x25/64 Inch				C—15/16x9/16 Inch				D—15/16x3/4 Inch				E—119/32x29/32 Inch			
Belt No.	Each	Lgth. Pitch In.	Wt., Lbs.	Belt No.	Each	Lgth. Pitch In.	Wt., Lbs.	Belt No.	Each	Lgth. Pitch In.	Wt., Lbs.	Belt No.	Each	Lgth. Pitch In.	Wt., Lbs.	Belt No.	Each	Lgth. Pitch In.	Wt., Lbs.
26A	$1.30	27.4	.1	35B	$2.00	36.7	.3	51C	$4.60	53.3	.8	120D	$19.80	122.5	3.9	180E	$42.50	183.6	8.6
31A	1.40	32.4	.2	38B	2.20	39.7	.3	60C	5.40	62.3	1.0	128D	21.10	130.5	4.1	195E	46.00	195.5	9.1
35A	1.50	36.4	.2	42B	2.40	43.7	.4	68C	6.10	70.3	1.1	144D	23.70	146.5	4.7	210E	49.60	210.5	9.8
38A	1.60	39.4	.2	46B	2.60	47.7	.4	75C	6.70	77.3	1.2	158D	26.00	160.5	5.1	240E	55.70	240.5	11.3
42A	1.70	43.4	.2	51B	2.80	52.7	.4	81C	7.30	83.3	1.3	162D	26.80	164.5	5.2	270E	62.60	270.5	12.7
46A	1.80	47.4	.2	55B	2.90	56.7	.5	85C	7.50	87.3	1.4	173D	28.40	175.5	5.6	300E	69.60	300.5	14.2
51A	1.90	52.4	.2	60B	3.00	61.7	.5	90C	8.10	92.3	1.5	180D	29.50	182.5	5.8	330E	76.60	330.5	15.5
60A	2.10	61.4	.3	68B	3.30	69.7	.6	96C	8.60	98.3	1.6	195D	32.00	195.2	6.2	360E	83.50	360.5	16.9
68A	2.30	69.4	.3	75B	3.60	76.7	.6	105C	9.40	107.3	1.7	210D	34.50	210.2	6.7	*420E	98.50	420.5	19.8
75A	2.50	76.4	.3	81B	3.90	82.7	.7	112C	10.00	114.3	1.8	240D	38.80	240.2	7.7	*480E	113.50	480.5	22.7
80A	2.70	81.4	.4	85B	4.10	86.7	.7	120C	10.70	122.3	1.9	270D	43.70	270.2	8.6	*540E	128.50	540.5	25.5
85A	2.90	86.4	.4	90B	4.30	91.7	.7	128C	11.40	130.3	2.2	300D	48.50	300.2	9.6	*600E	143.50	600.5	28.3
90A	3.10	91.4	.4	97B	4.70	98.7	.8	144C	12.80	146.3	2.4	330D	53.40	330.2	10.6	*660E	158.50	660.5	32.7
96A	3.30	97.4	.4	105B	5.00	106.7	.9	158C	14.00	160.3	2.7	360D	58.20	360.2	11.5	.....	.....	.....	....
105A	3.60	106.4	.5	112B	5.40	113.7	.9	162C	14.30	164.3	2.8	*420D	68.20	420.2	13.4	.....	.....	.....	....
112A	4.00	113.4	.5	120B	5.70	121.7	1.0	173C	15.30	175.3	2.9	*480D	78.20	480.2	15.4	.....	.....	.....	....
120A	4.30	121.4	.6	128B	6.10	129.7	1.1	180C	16.00	182.3	3.1	*540D	88.20	540.2	17.3	.....	.....	.....	....
128A	4.60	129.4	.6	144B	6.90	145.7	1.3	195C	17.30	195.4	3.3	*600D	98.20	600.2	18.3	.....	.....	.....	....
.....	....	.....	..	158B	7.50	159.7	1.4	210C	18.70	210.4	3.5	*660D	106.70	660.2	20.3	.....	.....	.....	....
.....	....	.....	..	173B	8.20	174.7	1.5	240C	21.00	240.4	4.0	.....	.....	.....	....	.....	.....	.....	....
.....	....	.....	..	180B	8.60	181.7	1.6	270C	23.70	270.4	4.5	.....	.....	.....	....	.....	.....	.....	....
.....	....	.....	..	195B	9.30	195.3	1.7	300C	26.30	300.4	5.1	.....	.....	.....	....	.....	.....	.....	....
.....	....	.....	..	210B	10.00	210.3	1.8	330C	28.90	330.4	5.6	.....	.....	.....	....	.....	.....	.....	....
.....	....	.....	..	240B	11.30	240.3	2.1	360C	31.50	360.4	6.1	.....	.....	.....	....	.....	.....	.....	....
.....	....	.....	..	270B	12.80	270.3	2.3	*390C	34.15	390.4	6.6	.....	.....	.....	....	.....	.....	.....	....
.....	....	.....	..	300B	14.20	300.3	2.6	*420C	36.80	420.4	7.1	.....	.....	.....	....	.....	.....	.....	....

Discontinued as Standard—To Be Used for Replacement

110A	$3.90	111.4	.5	136B	$6.50	137.7	1.2	136C	$12.10	138.3	2.3	225D	$36.65	225.2	7.2	144E	$34.10	147.6	6.9
136A	4.90	137.4	.6	225B	10.65	225.3	1.9	225C	19.85	225.4	3.7	255D	41.25	255.2	8.0	225E	52.65	225.5	10.5
144A	5.20	145.4	.7	255B	12.05	255.3	2.2	255C	22.35	255.4	4.3	285D	46.10	285.2	9.1	390E	90.45	390.5	18.4
158A	5.80	159.4	.8	285B	13.50	285.3	2.5	285C	25.00	285.4	4.8	315D	50.95	315.2	10.1	.....	.....	.....	....
173A	6.20	174.4	.8	315B	15.20	315.3	2.7	315C	27.60	315.4	5.3	345D	55.80	345.2	11.0	.....	.....	.....	....
180A	6.60	181.4	.9	.....	.....	.....	...	345C	30.20	345.4	5.8	390D	63.05	390.2	12.5	.....	.....	.....	....

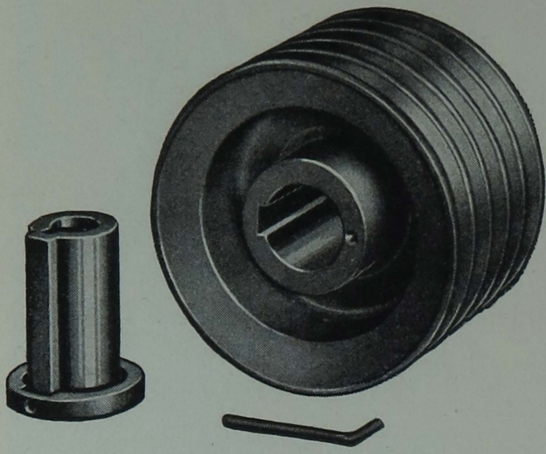
All the standard Vulco ropes listed except those marked with an asterisk (*) are carried in stock.

B and C section Vulco ropes, longer than those listed as standard, may be obtained in increments of 30 inches. Add $2.00 to the list price of a 300B and $3.00 to the list price of a 420C for each 30-inch increment.

D and E section Vulco ropes, longer than those listed as standard, may be obtained in increments of 60 inches. Add $10.00 to the list price of a 660D and $15.00 to the list price of a 660E for each 60-inch increment.

Gates Cast Iron Multiduty Sheaves

Bored, Turned and Balanced with Keyseats and Set Screws



We are in a position to furnish a complete line of cast iron sheaves for any size belts in any diameter or number of grooves. We can also furnish single grooves pressed steel sheaves for No. A, 2, B and 3 belts.

To order a complete drive the following information should be furnished:
H.p. and full load speed of driving shaft.
R.p.m. of driven shaft.
Required center distances.
Diameter and keyseat of driving shaft.
Diameter and keyseat of driven shaft.
Length of extension on both shafts.
Type of drive.
Kind of machine being driven.

For A Section Belts

Pitch Diam. In.	O.D. In.	Max. Bore In.	1 Groove-Face(F)—1" No.	Each	Wt. Lbs.	2 Grooves-Face(F)—1¾" No.	Each	Wt. Lbs.	3 Grooves—Face(F)—2½" No.	Each	Wt. Lbs.	4 Grooves—Face(F)—3¼" No.	Each	Wt. Lbs.	5 Grooves-Face(F)—4" No.	Each	Wt. Lbs.	6 Grooves-Face(F)—4¾" No.	Each	Wt., Lbs.
*3.0	3.75	1⅝	1A30M	$5.00	2.0	2A30M	$7.30	3.2	3A30M	$8.70	4.2	4A30M	$10.30	5.3	5A30M	$12.20	6.2	6A30M	$14.10	6.9
*3.2	3.95	1⅝	1A32M	5.10	2.2	2A32M	7.40	3.6	3A32M	8.80	4.5	4A32M	10.50	6.0	5A32M	12.40	6.9	6A32M	14.30	7.8
*3.4	4.15	1⅝	1A34M	5.20	2.4	2A34M	7.50	4.0	3A34M	8.90	5.0	4A34M	10.70	6.8	5A34M	12.60	7.8	6A34M	14.50	8.7
*3.6	4.35	1⅝	1A36M	5.30	2.6	2A36M	7.60	4.3	3A36M	9.00	5.4	4A36M	10.90	7.5	5A36M	12.80	8.7	6A36M	14.70	9.7
*3.8	4.55	1⅝	1A38M	5.40	2.7	2A38M	7.70	4.7	3A38M	9.20	5.9	4A38M	11.20	8.3	5A38M	13.00	9.7	6A38M	15.00	10.7
*4.0	4.75	1⅝	1A40M	5.50	2.9	2A40M	7.80	5.0	3A40M	9.40	6.4	4A40M	11.50	9.1	5A40M	13.30	10.6	6A40M	15.30	11.7
*4.2	4.95	1⅝	1A42M	5.60	3.1	2A42M	8.00	5.4	3A42M	9.60	6.9	4A42M	11.80	9.9	5A42M	13.60	11.4	6A42M	15.60	12.6
*4.4	5.15	1⅝	1A44M	5.70	3.3	2A44M	8.20	5.8	3A44M	9.80	7.4	4A44M	12.10	10.3	5A44M	13.90	12.1	6A44M	16.00	13.2
*4.6	5.35	1⅝	1A46M	5.80	3.5	2A46M	8.40	6.1	3A46M	10.00	7.9	4A46M	12.50	10.6	5A46M	14.20	12.5	6A46M	16.40	13.7
*4.8	5.55	1⅝	1A48M	6.00	3.7	2A48M	8.60	6.4	3A48M	10.30	8.5	4A48M	12.90	10.9	5A48M	14.50	12.9	6A48M	16.90	14.1
*5.0	5.75	1⅝	1A50M	6.20	3.9	2A50M	8.90	6.8	3A50M	10.60	8.9	4A50M	13.40	11.2	5A50M	14.90	13.1	6A50M	17.50	14.4
*5.2	5.95	1⅝	1A52M	6.40	4.1	2A52M	9.20	7.0	3A52M	10.90	9.2	4A52M	13.90	11.4	5A52M	15.30	13.3	6A52M	18.00	14.7
*5.4	6.15	1⅝	1A54M	6.60	4.3	2A54M	9.50	7.2	3A54M	11.30	9.5	4A54M	14.40	11.5	5A54M	15.80	13.5	6A54M	18.50	15.0
*5.6	6.35	1⅝	1A56M	6.80	4.4	2A56M	9.80	7.4	3A56M	11.70	9.6	4A56M	14.90	12.0	5A56M	16.30	13.7	6A56M	19.00	15.2
*5.8	6.55	1⅝	1A58M	7.00	4.5	2A58M	10.10	7.6	3A58M	12.00	9.9	4A58M	15.40	12.5	5A58M	16.70	14.4	6A58M	19.50	15.7
*6.0	6.75	1⅝	1A60M	7.20	4.6	2A60M	10.40	7.8	3A60M	12.40	10.1	4A60M	15.90	12.9	5A60M	17.20	14.8	6A60M	20.10	16.1
*6.2	6.95	1⅝	1A62M	7.40	4.8	2A62M	10.70	8.0	3A62M	12.70	10.3	4A62M	16.40	13.2	5A62M	17.60	15.2	6A62M	20.60	16.5
*6.4	7.15	1⅝	1A64M	7.60	5.0	2A64M	11.00	8.2	3A64M	13.10	10.5	4A64M	16.90	13.5	5A64M	18.10	15.6	6A64M	21.10	17.0
†7.0	7.75	2⁷⁄₁₆	1A70M	8.00	10.5	2A70M	11.40	12.5	3A70M	14.20	15.0	4A70M	18.20	17.5	5A70M	24.20	20.0	6A70M	32.70	22.0
†8.2	8.95	2⁷⁄₁₆	1A82M	9.10	11.5	2A82M	12.60	13.5	3A82M	16.10	16.0	4A82M	20.00	19.0	5A82M	26.10	22.0	6A82M	35.00	24.5
†9.0	9.75	2⁷⁄₁₆	1A90M	9.70	12.5	2A90M	13.40	15.5	3A90M	17.00	18.0	4A90M	21.20	21.5	5A90M	27.30	24.0	6A90M	36.40	27.0
†10.6	11.35	2⁷⁄₁₆	1A106M	11.10	14.0	2A106M	15.00	16.5	3A106M	19.80	20.0	4A106M	23.70	26.0	5A106M	29.80	28.5	6A106M	39.40	31.0
†12.0	12.75	2⁷⁄₁₆	1A120M	12.90	16.0	2A120M	16.70	20.0	3A120M	21.30	24.5	4A120M	26.00	29.0	5A120M	31.80	33.0	6A120M	41.20	37.5
†15.0	15.75	2⁷⁄₁₆	1A150M	15.20	20.0	2A150M	20.00	25.0	3A150M	26.00	30.0	4A150M	31.20	34.5	5A150M	37.00	39.5	6A150M	44.80	44.0
†18.0	18.75	2⁷⁄₁₆	1A180M	17.60	24.0	2A180M	23.80	28.0	3A180M	31.20	35.0	4A180M	37.00	40.0	5A180M	42.40	46.5	6A180M	50.80	52.5

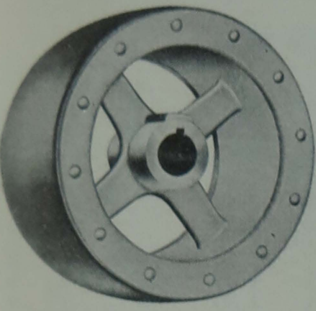
For B Section Belts

Pitch Diam. In.	O.D. In.	Max. Bore In.	1 Groove No.	Each	Wt. Lbs.	2 Grooves No.	Each	Wt. Lbs.	3 Grooves No.	Each	Wt. Lbs.	4 Grooves No.	Each	Wt. Lbs.	5 Grooves No.	Each	Wt. Lbs.	6 Grooves No.	Each	Wt. Lbs.
*4.6	4.95	1⅝	1B46M	$5.60	3.1	2B46M	$8.00	5.4	3B46M	$9.60	6.9	4B46M	$11.80	9.9	5B46M	$13.60	11.4	6B46M	$15.60	12.6
*4.8	5.15	1⅝	1B48M	5.70	3.3	2B48M	8.20	5.8	3B48M	9.80	7.4	4B48M	12.10	10.3	5B48M	13.90	12.1	6B48M	16.00	13.2
*5.0	5.35	1⅝	1B50M	5.80	3.5	2B50M	8.40	6.1	3B50M	10.00	7.9	4B50M	12.50	10.6	5B50M	14.20	12.5	6B50M	16.40	13.7
*5.2	5.55	1⅝	1B52M	6.00	3.7	2B52M	8.60	6.4	3B52M	10.30	8.5	4B52M	12.90	10.9	5B52M	14.50	12.9	6B52M	16.90	14.1
*5.4	5.75	1⅝	1B54M	6.20	3.9	2B54M	8.90	6.8	3B54M	10.60	8.9	4B54M	13.40	11.2	5B54M	14.90	13.1	6B54M	17.50	14.4
*5.6	5.95	1⅝	1B56M	6.40	4.1	2B56M	9.20	7.0	3B56M	10.90	9.2	4B56M	13.90	11.4	5B56M	15.30	13.3	6B56M	18.00	14.7
*5.8	6.15	1⅝	1B58M	6.60	4.3	2B58M	9.50	7.2	3B58M	11.30	9.5	4B58M	14.40	11.5	5B58M	15.80	13.5	6B58M	18.50	15.0
*6.0	6.35	1⅝	1B60M	6.80	4.4	2B60M	9.80	7.4	3B60M	11.70	9.6	4B60M	14.90	12.0	5B60M	16.30	13.7	6B60M	19.00	15.2
*6.2	6.55	1⅝	1B62M	7.00	4.5	2B62M	10.10	7.6	3B62M	12.00	9.9	4B62M	15.40	12.5	5B62M	16.70	14.4	6B62M	19.50	15.7
*6.4	6.75	1⅝	1B64M	7.20	4.6	2B64M	10.40	7.8	3B64M	12.40	10.1	4B64M	15.90	12.9	5B64M	17.20	14.8	6B64M	20.10	16.1
*6.6	6.95	1⅝	1B66M	7.40	4.8	2B66M	10.70	8.0	3B66M	12.70	10.3	4B66M	16.40	13.2	5B66M	17.60	15.2	6B66M	20.60	16.5
*6.8	7.15	1⅝	1B68M	7.60	5.0	2B68M	11.00	8.2	3B68M	13.10	10.5	4B68M	16.90	13.5	5B68M	18.10	15.6	6B68M	21.10	17.0
†7.4	7.75	2⁷⁄₁₆	1B74M	8.00	10.5	2B74M	11.40	12.5	3B74M	14.20	15.0	4B74M	18.20	17.5	5B74M	24.20	20.0	6B74M	32.70	22.0
†8.6	8.95	2⁷⁄₁₆	1B86M	9.10	11.5	2B86M	12.60	13.5	3B86M	16.10	16.0	4B86M	20.00	19.0	5B86M	26.10	22.0	6B86M	35.00	24.5
†9.4	9.75	2⁷⁄₁₆	1B94M	9.70	12.5	2B94M	13.40	15.5	3B94M	17.00	18.0	4B94M	21.20	21.5	5B94M	27.30	24.0	6B94M	36.40	27.0
†11.0	11.35	2⁷⁄₁₆	1B110M	11.10	14.0	2B110M	15.00	16.5	3B110M	19.80	20.0	4B110M	23.70	26.0	5B110M	29.80	28.5	6B110M	39.40	31.0
†12.4	12.75	2⁷⁄₁₆	1B124M	12.90	16.0	2B124M	16.70	20.0	3B124M	21.30	24.5	4B124M	26.00	29.0	5B124M	31.80	33.0	6B124M	41.20	37.5
†15.4	15.75	2⁷⁄₁₆	1B154M	15.20	20.0	2B154M	20.00	25.0	3B154M	26.00	30.0	4B154M	31.20	34.5	5B154M	37.00	39.5	6B154M	44.80	44.0
†18.4	18.75	2⁷⁄₁₆	1B184M	17.60	24.0	2B184M	23.80	28.0	3B184M	31.20	35.0	4B184M	37.00	40.0	5B184M	42.40	46.5	6B184M	50.80	52.5

*Type 1, hub offset. †Type 2, hub central.

Rockwood Paper Pulleys

Special Sizes



Rockwood Paper Pulleys are for use on electric motors, generators, drop hammers, grinders, pulverizers, pumps, and other belted machinery.

The use of these pulleys results directly in economy through the greater transmission of power.

The high coefficient of friction may be taken advantage of in any one of the following ways: reduced belt slippage, decreased belt tension, greater power transmission, lower cost of pulleys and belting.

The lighter tension on the belt reduces all strains, permitting lighter shafting, hangers, etc., and reduces consumption of oil and trouble resulting from hot bearings. There being minimum slippage of the belt, wear is decreased, and belt expense materially reduced.

Rockwood Paper Pulleys may be relied upon to transmit all the power a belt will carry without a tightener, the belt, not the pulley, being the limit.

As there are no shrinkage strains as in cast iron, or numerous pieces, as in wooden pulleys, they may be run at high rates of speed with safety.

They are not injured by steam or atmospheric conditions and are guaranteed to give entirely satisfactory service.

Rockwood Paper Pulleys consist of a solid block of tough wear-resisting fibre built around and into a heavy cast iron hub.

The end-grain is exposed as a surface to grip the belt surely and firmly, a surface made up of layers of fibre hydraulically compressed and cemented. Because of their end-grain fibre construction Rockwood Paper Pulleys grip the belt and provide maximum belt-pull.

Light shafting and bearings are permitted by low belt-tension.

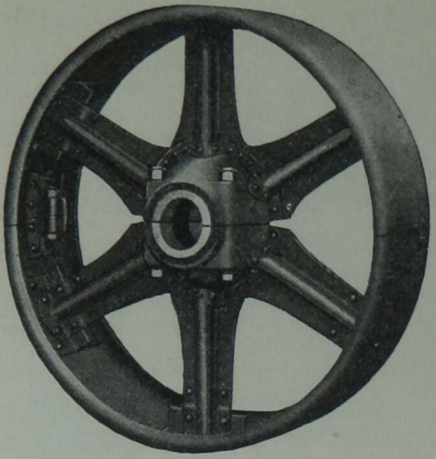
Paper being a non-magnetic material, Rockwood Paper Pulleys are not subject to the attraction of dynamo or motor fields, thereby relieving the armature shaft and collars of end strains.

These pulleys are lighter than cast iron pulleys for a given service and are easier to put on or remove.

Diam. Inches	Each Total Face, Width, Inches														
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1½	$4.40	$4.50	$4.60	$4.80	$5.40	$6.20	$7.20	.....	.....	.....	.....	.....	.....	.....	.....
2	4.50	4.60	4.70	5.00	5.60	6.40	7.40	$8.40	.....	.....	.....	.....	.....	.....	.....
2½	4.60	4.80	5.00	5.30	5.80	6.60	7.60	8.60	$9.60	.....	.....	.....	.....	.....	.....
3	4.80	5.00	5.30	5.60	6.10	6.90	7.90	8.90	9.90	$10.90	.....	.....	.....	.....	.....
3½	5.00	5.20	5.60	6.00	6.50	7.20	8.20	9.20	10.20	11.20	$12.30	.....	.....	.....	.....
4	5.30	5.60	6.00	6.40	6.90	7.50	8.50	9.50	10.50	11.50	12.60	$13.80	.....	.....	.....
4½	5.70	6.00	6.40	6.80	7.30	7.90	8.80	9.80	10.80	11.80	12.90	14.30	$17.00	.....	.....
5	6.10	6.40	6.80	7.20	7.70	8.30	9.10	10.10	11.10	12.10	13.30	14.90	17.60	$22.60	.....
5½	6.50	6.80	7.20	7.60	8.10	8.70	9.50	10.50	11.50	12.50	13.70	15.60	18.30	23.30	$29.40
6	6.90	7.30	7.70	8.10	8.60	9.20	10.00	11.10	12.20	13.30	14.50	16.40	19.10	24.10	30.20
7	7.60	8.00	8.40	9.00	9.60	10.20	11.00	12.10	13.20	14.30	15.80	17.90	20.60	25.60	31.70
8	8.40	8.80	9.30	9.90	10.60	11.30	12.10	13.20	14.40	15.70	17.30	19.50	22.20	27.20	33.30
9	9.20	9.60	10.20	10.80	11.60	12.40	13.20	14.40	15.70	17.20	18.90	21.10	23.80	28.80	34.90
10	10.00	10.50	11.10	11.80	12.60	13.50	14.40	15.70	17.10	18.70	20.60	22.90	25.60	30.60	36.70
11	10.80	11.40	12.10	12.80	13.60	14.60	15.60	17.00	18.50	20.20	22.30	24.90	28.10	33.10	39.20
12	11.60	12.30	13.10	13.90	14.70	15.80	16.90	18.30	19.90	21.70	24.10	27.10	30.70	35.70	41.80
13	12.50	13.20	14.10	15.00	15.90	17.00	18.20	19.90	21.60	23.50	26.20	29.50	33.40	38.50	44.60
14	13.40	14.10	15.10	16.10	17.10	18.30	19.70	21.50	23.30	25.40	28.30	31.90	36.20	41.40	47.50
15	.....	15.10	16.10	17.20	18.30	19.70	21.20	23.10	25.00	27.30	30.50	34.50	39.10	44.40	50.50
16	.....	16.10	17.20	18.30	19.50	21.10	22.70	24.70	26.80	29.30	32.80	37.10	42.00	47.50	53.60
17	.....	17.20	18.30	19.50	20.90	22.60	24.30	26.40	28.70	31.50	35.20	39.70	44.90	50.60	56.70
18	.....	18.30	19.40	20.70	22.30	24.10	25.90	28.20	30.70	33.80	37.70	42.40	47.80	53.70	59.90
19	.....	19.40	20.60	22.00	23.70	25.60	27.60	30.00	32.80	36.20	40.30	45.20	50.80	56.80	63.10
20	.....	20.50	21.80	23.30	25.10	27.10	29.40	32.00	35.10	38.80	43.10	48.10	53.80	60.00	66.40
21	.....	21.60	23.10	24.80	26.70	28.70	31.20	34.00	37.40	41.40	45.90	51.10	57.00	63.30	69.80
22	.....	22.80	24.40	26.30	28.30	30.40	33.00	36.10	39.80	44.00	48.70	54.10	60.20	66.60	73.20
23	.....	24.00	25.70	27.80	30.00	32.20	34.80	38.30	42.20	46.60	51.60	57.20	63.40	69.90	76.70
24	.....	25.30	27.10	29.30	31.70	34.10	36.90	40.60	44.70	49.30	54.50	60.30	66.70	73.30	80.30
25	.....	26.60	28.50	30.80	33.40	36.10	39.20	43.00	47.30	52.10	57.50	63.50	70.10	76.80	83.90
26	.....	28.00	30.00	32.50	35.10	38.20	41.60	45.50	49.90	54.90	60.50	66.70	73.50	80.40	87.50
27	.....	29.50	31.60	34.20	36.80	40.30	44.00	48.00	52.60	57.80	63.70	70.10	77.00	84.00	91.20
28	.....	31.00	33.20	36.00	38.90	42.50	46.40	50.60	55.40	60.90	66.90	73.60	80.50	87.70	95.10
29	.....	.....	35.00	37.90	41.10	44.80	49.00	53.40	58.50	64.20	70.30	77.10	84.10	91.50	99.10
30	.....	.....	37.00	40.00	43.50	47.40	51.70	56.40	61.60	67.50	73.80	80.80	87.90	95.40	103.20
31	.....	.....	39.20	42.30	46.00	50.00	54.50	59.50	64.80	71.00	77.40	84.50	91.80	99.40	107.40
32	.....	.....	41.40	44.60	48.50	52.70	57.40	62.60	68.10	74.50	81.10	88.30	95.80	103.60	111.70
33	.....	.....	43.60	46.90	51.00	55.50	60.40	65.70	71.40	78.00	84.80	92.10	99.90	107.80	116.00
34	.....	.....	45.90	49.20	53.50	58.30	63.40	68.90	74.80	81.50	88.50	96.00	104.00	112.10	120.50
35	.....	.....	48.20	51.50	56.00	61.10	66.40	72.10	78.20	85.10	92.30	100.10	108.20	116.60	125.20
36	.....	.....	50.50	53.80	58.50	63.90	69.40	75.30	81.60	88.70	96.20	104.20	112.50	121.10	129.90
37	.....	.....	52.80	56.10	61.00	66.70	72.40	78.50	85.00	92.40	100.10	108.40	117.00	125.80	134.70
38	.....	.....	55.20	58.50	63.50	69.50	75.50	81.70	88.40	96.10	104.10	112.70	121.50	130.50	139.90
39	.....	.....	57.60	60.90	66.00	72.30	78.60	85.00	92.00	99.80	108.20	117.00	126.20	135.50	145.20
40	.....	.....	60.00	63.30	68.50	75.10	81.70	88.30	95.60	103.50	112.40	121.40	130.90	140.60	150.50
41	.....	.....	.....	65.70	71.00	77.90	84.80	91.70	99.20	107.40	116.60	125.90	135.80	145.90	156.20
42	.....	.....	.....	68.10	73.50	80.70	87.90	95.10	102.80	111.50	120.80	130.50	140.80	151.20	161.90
43	.....	.....	.....	70.50	76.00	83.50	91.00	98.50	106.60	115.60	125.20	135.40	146.00	156.70	167.90
44	.....	.....	.....	72.90	78.70	86.30	94.10	101.90	110.50	119.90	129.80	140.30	151.30	162.30	173.90
45	.....	.....	.....	75.30	81.40	89.20	97.20	105.50	114.60	124.30	134.60	145.60	156.80	168.10	180.20
46	.....	.....	.....	77.70	84.10	92.20	100.40	109.30	118.80	128.80	139.50	150.90	162.40	174.10	186.50
47	.....	.....	.....	80.10	86.90	95.30	103.90	113.20	123.10	133.50	144.50	156.10	168.10	180.20	193.00
48	.....	.....	.....	82.50	89.80	98.40	107.50	117.20	127.50	138.30	149.60	161.40	173.80	186.40	199.50
49	.....	.....	.....	84.90	92.70	101.80	111.40	121.50	132.10	143.30	154.90	167.10	179.80	192.80	206.30
50	.....	.....	.....	87.30	95.60	105.20	115.30	125.80	136.80	148.30	160.30	172.80	185.80	199.20	213.20

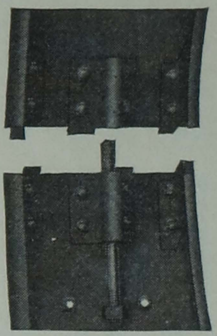
Dodge Steel Split Pulleys

Oneida Type

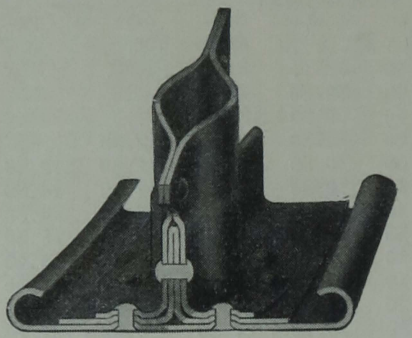


These pulleys combine strength with light weight and many exclusive features all contributing to their ruggedness, convenience in erection and ability to transmit maximum power with minimum loss.

Pulleys are fabricated from limed steel sheets with high rust-resisting qualities. Double arms are provided in wide face pulleys. There is a row of arms supporting the rim directly under the belt regardless of the side on which the belt is running. Pulleys can be operated at any practical belt speed and are entirely suitable for practically any power transmitting service.



The new rim lug and bead clips used on these pulleys in sizes from 24 to 96-inch diameter in faces 6 inches and wider. This feature facilitates erection of pulley on shaft.

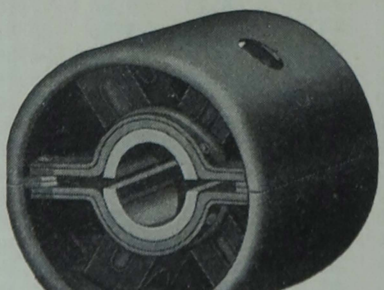


This method of countersinking metals relieves the rivets of lateral and shearing strain and they function only to hold the metal together. Rivets are slightly below surface of belt and cannot touch or injure belt.

Diameter Inches	Face	Construction	Diameter Inches	Face	Construction
6–11	All	4-Arm	24–96	3, 4 & 5	6-Arm
12–14	2″ Only	4-Arm	24–96	6″ & Up	6-Arm
12–17	All	4-Arm	42–70	8″ & Up	*6-Arm
18–20	3, 4 & 5	4-Arm	72–96	All	†6-Arm
18–20	6″ & Up	6-Arm	98–144	All	†8-Arm
21–23	All	6-Arm	.....	....	......

*Single reinforced. †Double reinforced.

Small Sizes



This pulley supplies the demand for a steel split pulley having the general characteristics of ruggedness and convenience in 3, 4 and 5-inch diameters and 3 to 6-inch faces.

Compression bolts which clamp pulleys to shaft are easily accessible through holes in pulley face and have special milled square heads.

Three-inch pulleys have hubs 3 inches long and standard bore of 1⁷⁄₁₆ inches; 4 and 5-inch pulleys have standard bore of 1¹⁵⁄₁₆ inches and hubs 3 inches long. Interchangeable metal bushings furnished for all shaft sizes in 16ths, symbol L bushing for 1⁷⁄₁₆ inch bore and symbol N bushing for 1¹⁵⁄₁₆ inch bore.

One bushing and socket wrench supplied with each pulley.

Dodge Steel Split Pulleys

Oneida Type

Diam. In.	Face In.	Each
3	3	$2.40
	4	2.52
	5	2.68
	6	3.00
4	3	2.52
	4	2.64
	5	2.75
	6	3.10
5	3	2.64
	4	2.75
	5	2.87
	6	3.25
6	2	3.15
	3	3.30
	4	3.45
	5	3.75
	6	4.05
	8	4.60
	10	5.20
	12	5.90
7	2	3.22
	3	3.38
	4	3.60
	5	3.90
	6	4.20
	8	4.80
	10	5.40
	12	6.10
8	2	3.30
	3	3.45
	4	3.75
	5	4.05
	6	4.35
	8	4.95
	10	5.60
	12	6.25
9	2	3.38
	3	3.60
	4	3.90
	5	4.20
	6	4.50
	8	5.10
	10	5.75
	12	6.35
10	2	3.45
	3	3.75
	4	4.05
	5	4.35
	6	4.65
	8	5.25
	10	5.90
	12	6.45
11	2	3.65
	3	3.90
	4	4.20
	5	4.50
	6	4.80
	8	5.40
	10	6.00
	12	6.90
12	2	3.90
	3	4.20
	4	4.63
	5	4.80
	6	5.33
	8	5.78
	10	6.45
	12	7.65
	14	9.00
	16	10.25
13	2	4.05
	3	4.35
	4	4.80
	5	5.20
13	6	$5.62
	8	6.43
	10	7.20
	12	8.40
	14	9.50
	16	10.75
14	2	4.20
	3	4.50
	4	5.20
	5	5.65
	6	6.15
	8	7.05
	10	8.03
	12	9.00
	14	10.00
	16	11.25
15	3	4.65
	4	5.45
	5	5.80
	6	6.55
	8	7.65
	10	8.80
	12	9.75
	14	10.75
	16	12.00
16	3	4.95
	4	5.75
	5	6.10
	6	6.90
	8	8.25
	10	9.45
	12	10.50
	14	11.50
	16	12.65
17	3	5.25
	4	6.00
	5	6.50
	6	7.28
	8	8.78
	10	10.05
	12	11.25
	14	12.40
	16	13.65
18	3	5.55
	4	6.38
	5	7.00
	6	7.65
	8	9.30
	10	10.65
	12	12.00
	14	13.25
	16	14.50
19	3	5.80
	4	6.75
	5	7.50
	6	8.25
	8	10.13
	10	11.25
	12	12.90
	14	14.20
	16	15.60
20	3	6.00
	4	7.50
	5	8.10
	6	9.00
	8	10.73
	10	12.00
	12	14.25
	14	15.30
	16	16.90
21	3	6.25
	4	8.00
	5	8.90
	6	9.60
21	8	$11.25
	10	12.98
	12	15.60
	14	18.00
	16	20.55
22	3	6.50
	4	8.55
	5	9.50
	6	10.28
	8	12.00
	10	14.10
	12	16.80
	14	19.50
	16	21.30
23	3	7.00
	4	8.70
	5	9.90
	6	10.58
	8	12.60
	10	14.75
	12	18.00
	14	21.00
	16	24.30
24	3	7.50
	4	8.90
	5	10.00
	6	10.95
	8	13.20
	10	15.68
	12	19.05
	14	22.65
	16	26.25
	18	29.92
	20	34.50
25	4	9.20
	6	11.45
	8	13.80
	10	16.40
	12	20.20
	14	24.50
	16	29.25
	18	35.05
	20	39.50
26	4	9.55
	6	11.95
	8	14.40
	10	17.10
	12	21.30
	14	26.25
	16	31.20
	18	36.15
	20	41.40
28	4	10.80
	6	12.90
	8	15.45
	10	18.15
	12	22.90
	14	28.50
	16	34.50
	18	40.35
	20	46.35
30	4	12.00
	6	14.10
	8	17.25
	10	19.90
	12	24.75
	14	31.50
	16	38.10
	18	45.00
	20	49.50
	22	55.50
	24	61.50
	26	67.50
	28	74.25
	30	81.67

Dodge Steel Split Pulleys

Oneida Type

Continued

Diam. In.	Face In.	Each
32	4	$13.20
	6	15.45
	8	19.35
	10	22.50
	12	26.86
	14	34.15
	16	41.65
	18	48.37
	20	54.37
	22	60.37
	24	66.37
	26	72.37
	28	79.60
	30	87.56
	32	96.31
34	4	14.40
	6	17.25
	8	21.75
	10	25.50
	12	30.00
	14	36.75
	16	45.00
	18	51.75
	20	57.45
	22	63.75
	24	69.75
	26	75.00
	28	82.50
	30	90.75
	32	99.82
36	4	15.90
	6	19.50
	8	24.00
	10	28.65
	12	33.75
	14	39.75
	16	48.60
	18	55.50
	20	61.50
	22	67.50
	24	73.50
	26	79.50
	28	87.45
	30	96.19
	32	105.80
	34	116.38
	36	128.01
38	4	19.50
	6	21.75
	8	26.40
	10	31.05
	12	37.15
	14	42.75
	16	51.75
	18	58.87
	20	64.87
	22	70.87
	24	76.87
	26	82.87
	28	91.15
	30	100.26
	32	110.28
	34	121.30
	36	133.43
40	4	21.00
	6	24.00
	8	28.50
	10	33.75
	12	40.15
	14	46.50
	16	55.15
	18	62.25
	20	69.75
	22	77.25
40	24	$84.75
	26	92.55
	28	101.80
	30	111.98
	32	123.17
	34	135.48
	36	149.02
42	4	23.25
	6	26.25
	8	32.25
	10	37.50
	12	43.50
	14	50.25
	16	57.75
	18	65.62
	20	73.12
	22	80.62
	24	88.12
	26	95.62
	28	105.18
	30	115.69
	32	127.25
	34	139.97
	36	153.96
44	6	29.25
	8	35.62
	10	41.25
	12	47.25
	14	54.00
	16	61.12
	18	69.00
	20	78.00
	22	87.00
	24	96.00
	26	105.00
	28	115.50
	30	127.05
	32	139.75
	34	153.72
	36	169.09
46	6	33.00
	8	39.00
	10	45.00
	12	50.25
	14	57.75
	16	64.50
	18	72.00
	20	81.00
	22	90.00
	24	99.00
	26	108.00
	28	118.80
	30	130.68
	32	143.74
	34	158.11
	36	173.92
48	6	36.75
	8	42.00
	10	48.75
	12	54.00
	14	61.50
	16	67.50
	18	75.00
	20	87.00
	22	99.00
	24	111.00
	26	123.00
	28	135.30
	30	148.83
	32	163.71
	34	180.08
	36	198.08
50	6	40.87
	8	47.25
	10	53.25
50	12	$58.50
	14	66.00
	16	75.00
	18	84.00
	20	96.00
	22	108.00
	24	120.00
	26	132.00
	28	145.20
	30	159.72
	32	175.69
	34	193.25
	36	212.57
52	6	46.50
	8	51.00
	10	57.00
	12	63.00
	14	69.00
	16	78.75
	18	90.00
	20	102.00
	22	114.00
	24	126.00
	26	138.00
	28	151.80
	30	166.98
	32	183.67
	34	202.03
	36	222.23
54	6	50.25
	8	56.25
	10	61.50
	12	67.50
	14	74.25
	16	83.25
	18	96.75
	20	108.75
	22	120.75
	24	132.75
	26	144.75
	28	159.22
	30	175.14
	32	192.65
	34	211.91
	36	233.10
56	6	54.00
	8	60.75
	10	66.75
	12	72.75
	14	80.25
	16	90.00
	18	104.25
	20	119.25
	22	134.25
	24	149.25
	26	164.25
	28	180.67
	30	198.73
	32	218.60
	34	240.46
	36	264.50
58	6	60.00
	8	65.25
	10	71.25
	12	78.37
	14	86.62
	16	96.37
	18	110.62
	20	125.62
	22	140.62
	24	155.62
	26	170.62
	28	187.68
	30	206.44
	32	227.08

Dodge Steel Split Pulleys

Important Information

1. The list prices given are for pulleys of standard construction. Pulleys having special features will be quoted on upon receipt of full information.

2. No pulleys are made in odd widths of face over 5-inch face. This applies to pulleys 7, 9 and 11-inch face, etc.

3. Pulleys can be furnished in odd diameters above 25-inch as follows: 27, 29, 31, 33, 35, 37, and 39-inch, at an extra charge of 25 per cent to next higher regular list.

4. Pulleys from 3 to 10 inches in diameter inclusive and wide face conveyor pulleys require special wrenches. These are furnished without charge and without necessity of ordering them specially. All other steel pulleys can be mounted with standard wrenches. Wrenches are therefore not furnished except as above stated, unless specially ordered, in which case a charge will be made for same.

5. GG means two separate G hubs.
HH means two separate H hubs.
HHH means three separate H hubs.
II means two separate I hubs.
III means three separate I hubs.
IIII means four separate I hubs.

6. IMPORTANT NOTE:— All pulleys used on 2½-inch diameter shafting and larger should be fitted with a bushing. For example, if a 20x6 pulley, which is regularly made with a G hub having a 3½-inch bore, is required for use on a 3½-inch shaft, the 4$\frac{7}{16}$-inch symbol I hub bushed to 3½-inch should be used.

This also applies to pulleys having 4$\frac{7}{16}$-inch standard bore when required for use on a 4$\frac{7}{16}$-inch shaft, in which case the 6½-inch symbol J hub should be used. Also in the case of pulleys having 6½-inch standard bore required for use on a 6½-inch shaft, when the 8½-inch symbol K hub should be used and bushed to 6½-inch bore. Unless otherwise specified, orders will be executed as above.

Special Hubs for Dodge Steel Pulleys

I Hubs in Place of G or H Hubs

Diameters Faces, Inches	Special Hub		IN SUBSTITUTION FOR:	
			G Hubs	H Hubs
14–17 to 14	I	extra per pulley	$5.00	.....
18–20 to 5	I	extra per pulley	5.00	.....
18–25 to 12	I	extra per pulley	3.10	$2.80
18–25, 14 to 24	II	extra per pulley	6.20	5.60
18–25, 26 Up	III	extra per pulley	9.30	8.40
26–30 to 8	I	extra per pulley	3.60	3.30
26–30 10 Up	I	No Extra Charge		
32–36 to 6	I	extra per pulley	3.60	3.30
Above 36 to 6	I	No Extra Charge		

I hubs not furnished in diameters smaller than 14-inch.

J Hubs in Place of G, H or I Hubs

	IN SUBSTITUTION FOR:		
	G Hubs	H Hubs	I Hubs
Pulleys Having 1 Hub	$9.00	$8.10	$5.00
Pulleys Having 2 Hubs	18.00	16.20	10.00
Pulleys Having 3 Hubs	.....	24.30	15.00
Pulleys Having 4 Hubs	.....	.....	20.00
For Pulleys Larger than 60″ Diam.	No Extra Charge		

J hubs not furnished in pulleys smaller than 17-inch diameter; nor double hubs smaller than 22-inch diameter.

K Hubs in Place of G, H or I Hubs

Pulleys Having 1 Hub	$12.90	$12.60	$6.00
Pulleys Having 2 Hubs	25.80	25.20	12.00
Pulleys Having 3 Hubs	.....	37.80	18.00
Pulleys Having 4 Hubs	.....	.....	24.00
For Pulleys Larger than 60″ Diam.	No Extra Charge		

K hubs not furnished in pulleys smaller than 17-inch diameter; nor double hubs smaller than 24-inch diameter.

Net Extras for Heavy Duty Construction

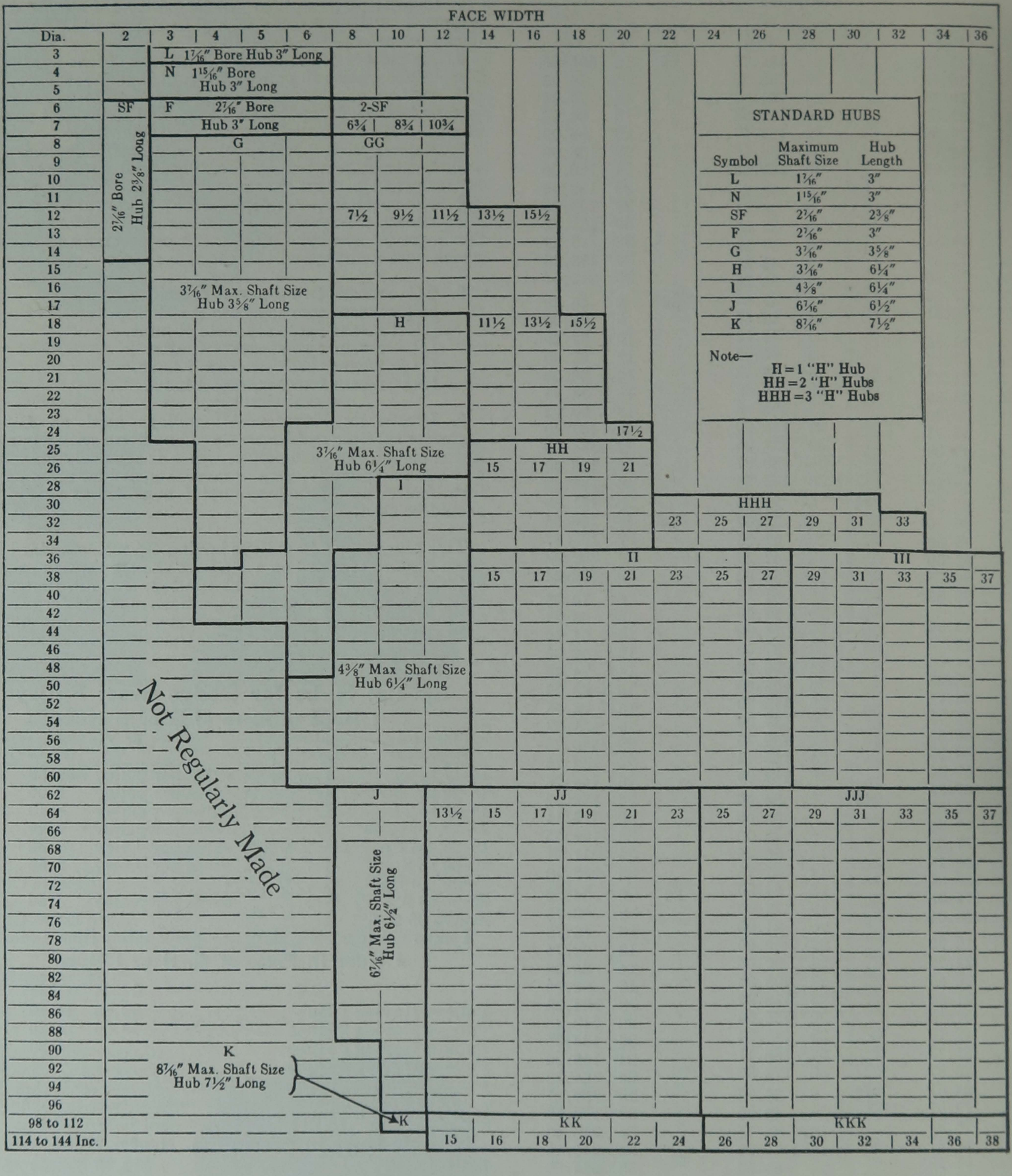
Diameters	in.	Up to 70	72-144 Incl.
For 8-Arm, 4$\frac{7}{16}$″ Bore	extra per hub	$20.00	$25.00
For 8-Arm, 8½″ Bore	extra per hub	25.00	30.00

Double hub pulleys twice the above—triple hubs 3 times the above, 4-hub pulleys, 4 times the above.

Heavy duty pulleys not made under 24-inch diameter in single hub and 28-inch diameter in double hub.

Dodge Steel Split Pulleys

Chart Showing Kind and Number of Centers, Standard Bores and Length Through Hubs


FACE WIDTH
Dia.
2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36
3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96
98 to 112
114 to 144 Inc.
L 1⅞" Bore Hub 3" Long
N 1¹⁵⁄₁₆" Bore Hub 3" Long
SF
2⁷⁄₁₆" Bore Hub 2⅜" Long
F 2⁷⁄₁₆" Bore Hub 3" Long
2-SF
6¾ | 8¾ | 10¾
G
GG
7½ 9½ 11½ 13½ 15½
3⁷⁄₁₆" Max. Shaft Size Hub 3⅝" Long
H
11½ 13½ 15½
17½
3⁷⁄₁₆" Max. Shaft Size Hub 6¼" Long
HH
15 17 19 21
I
HHH
23 25 27 29 31 33
II
15 17 19 21 23 25 27
III
29 31 33 35 37
4⅜" Max Shaft Size Hub 6¼" Long
Not Regularly Made
J
JJ
13½ 15 17 19 21 23
25 27
JJJ
29 31 33 35 37
6⁷⁄₁₆" Max. Shaft Size Hub 6½" Long
K
8⁷⁄₁₆" Max. Shaft Size Hub 7½" Long
K
KK
15 16 18 20 22 24
KKK
26 28 30 32 34 36 38

STANDARD HUBS

Symbol	Maximum Shaft Size	Hub Length
L	1⁷⁄₁₆"	3"
N	1¹⁵⁄₁₆"	3"
SF	2⁷⁄₁₆"	2⅜"
F	2⁷⁄₁₆"	3"
G	3⁷⁄₁₆"	3⅝"
H	3⁷⁄₁₆"	6¼"
I	4⅜"	6¼"
J	6⁷⁄₁₆"	6½"
K	8⁷⁄₁₆"	7½"

Note—
H = 1 "H" Hub
HH = 2 "H" Hubs
HHH = 3 "H" Hubs

Bushing..........	L	N	O	SO	SF	F	A	G	H	I	J	K
Each..............	**$.30**	**.30**	**.60**	**.60**	**.60**	**.60**	**.60**	**.60**	**.90**	**1.20**	**4.00**	**6.00**
*Dimen........in.	1⁷⁄₁₆x3	1¹⁵⁄₁₆x3	2⁷⁄₁₆x2⅜	2⁷⁄₁₆x2½	2⁷⁄₁₆x2⅜	2⁷⁄₁₆x3	3½x2¾	3½x3⅝	3½x6¼	4⁷⁄₁₆x6¼	6½x6½	8½x7½

*Bushing dimensions are the outside diameter x length.

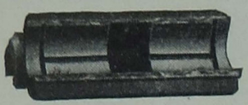
Extreme Width Measurements of Steel Pulley Rims

Dodge (Oneida type) steel pulleys overrun the nominal faces as set forth below:
Pulleys made with SO hubs ¼ inch.
Pulleys made with L or N hubs ½ inch.
Pulleys made with SF, A or F hubs ⅝ inch.
Pulleys made with G, H, I, J or K hubs 1 inch.

Please note, however, that only about ½ of this excess width is effectual belt surface. Dodge (Keystone type) steel split pulleys are always made with a face ¼ inch wider than the belt.

Split Bushings

For Tight and Loose Pulleys



These bushings can be easily placed upon the shaft, with a split pulley, without the necessity of taking down the shaft or disturbing any of the other equipment.

They are cast in one piece, bored and turned and then split by fracture. The uneven, ragged edges, bring the 2 halves together to a smooth, accurate fit. They are held in a secure position by the compression of the pulley hub.

A large reservoir in the center holds the lubricating oil. Circular and lengthwise gains distribute it evenly in the bearing, returning it to the oil chamber when the pulley is not in motion. The oil chamber is filled through a spring oiler.

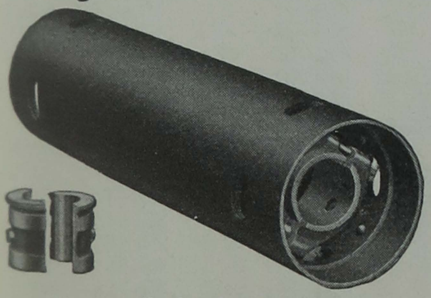
Split loose bushings are made 2 7/16, 2 15/16, 3½ and 4 7/16-inch diameter according to shaft size. The price list gives size of shaft and the length and outside diameter of the bushings.

The 3 7/16-inch bushings are used for standard iron split pulleys; 3½-inch are used for steel and wood pulleys.

O. D. In.	Bore Inches	Length Inches	Price Each	O.D. In.	Bore Inches	Length Inches	Price Each
2 7/16	1 -1¾	4½	$3.45	3½ & 3 7/16	1 3/16 -2¾	5½	$4.95
2 7/16	1 -1¾	5½	3.85	3½ & 3 7/16	1 3/16 -2¾	6½	5.50
2 7/16	1 -1¾	6½	4.30	3½ & 3 7/16	1 3/16 -2¾	7½	6.50
2 7/16	1 -1¾	7½	4.75	3½ & 3 7/16	1 3/16 -2¾	9½	8.30
2 15/16	1 -2 3/16	4½	3.85	3½ & 3 7/16	1 3/16 -2¾	10½	9.50
2 15/16	1 -2 3/16	5½	4.50	3½ & 3 7/16	1 3/16 -2¾	12½	10.70
2 15/16	1 -2 3/16	6½	5.00	4 7/16	1 15/16-3 7/16	6½	8.00
2 15/16	1 -2 3/16	7½	5.50	4 7/16	1 15/16-3 7/16	7½	9.00
2 15/16	1 -2 3/16	9½	6.50	4 7/16	1 15/16-3 7/16	9½	10.90
2 15/16	1 -2 3/16	10½	7.00	4 7/16	1 15/16-3 7/16	10½	12.20
2 15/16	1 -2 3/16	12½	8.00	4 7/16	1 15/16-3 7/16	12½	14.50
3½ & 3 7/16	1 3/16-2¾	4½	4.30	....	....	....	....

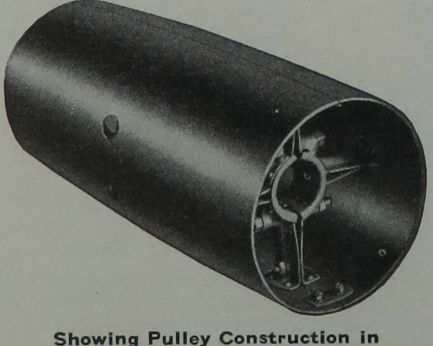
Bushings are used 1½-inch longer than nominal face width of pulley.

Dodge Wide Face Steel Conveyor Pulleys



Showing Pulley Construction in 6 and 8-Inch Diameters

These pulleys offer many advantages to the manufacturer and user of conveyor equipment. They are entirely suitable for any service when a belt not exceeding 5 plies is used. They are also suitable for snub, foot and gravity take-up pulley service for belts over 5 plies in thickness. The grooveless oval crown insures uniform belt contact over the entire face of the pulley, minimizing slippage, saving power and prolonging belt life.



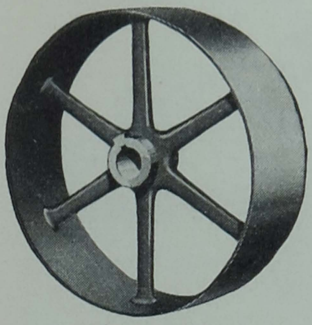
Showing Pulley Construction in 10-Inch Diameters and Larger

The rim parting is supported directly from the hub, eliminating destructive vibration at this point. The rim edges are turned in a lathe, insuring balance and running truth. There are no pockets for the collection of dust and dirt.

All hub and rim bolts are easily accessible. Pulleys are held firmly to shaft by means of compression which is accomplished by tightening the bolts.

The use of interchangeable bushings adapts these pulleys to any shaft within their range of bore, and gives them a high re-use value. Prices upon application.

Cast Iron Solid and Split Pulleys



Solid Single Arm

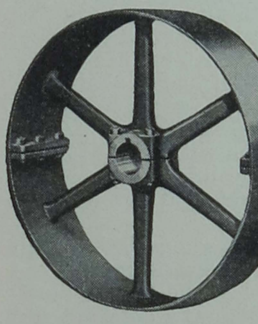
Cast iron pulleys are designated in accordance with the service which they are to perform, such as double belt, triple belt, etc., these terms referring to leather belting to be used in connection with them. These pulleys are designed and built to withstand the strains under which the respective belts, whether single, double or triple, can be expected to operate.

Keys are never furnished unless specifically ordered.

Ordering

In ordering cast iron pulleys, give the following information:

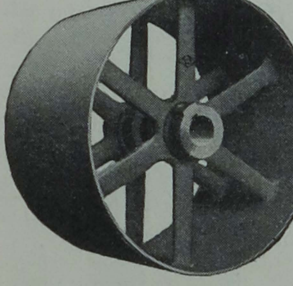
Double belt, triple belt, etc.
Solid or split construction.
Crown or straight face.
Set screws only, or key-seated and set screws.
Special conditions of service.
Special hub details if any, and location of hub.



Split Single Arm

Double Arm Pulleys

Unless otherwise specified, double arm pulleys will be made in 2 separate pulleys finished side by side. If required to be made in one casting, as illustrated, quotations will be forwarded on application.

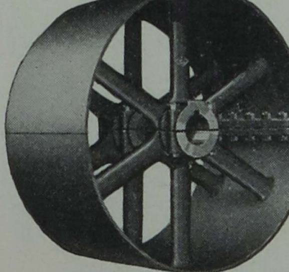


Solid Double Arm

Table of Maximum Bores Furnished at Regular Price

Diam. Pulley Inches	Maximum Bore Inches
3	1½
4 to 9 Incl.	1 15/16
10 to 15 Incl.	2 7/16
16 to 20 Incl.	2 15/16
21 to 30 Incl.	3 7/16
31 to 42 Incl.	3 15/16
43 to 48 Incl.	4 7/16
49 to 60 Incl.	4 15/16
61 to 72 Incl.	5 7/16

Larger Bores than Furnished at Regular Price



Split Double Arm

In diameters 3 to 15 inches, inclusive, add 10 per cent for each additional ¼ inch, or fractional part thereof.

In diameters 16 to 30 inches, inclusive, add 10 per cent for each additional ½ inch, or fractional part thereof.

In diameters 31 to 60 inches, inclusive, add 5 per cent for each additional ½ inch, or fractional part thereof.

In diameters 61 to 72 inches, inclusive, add 5 per cent for each inch or fractional part thereof.

Small Bores

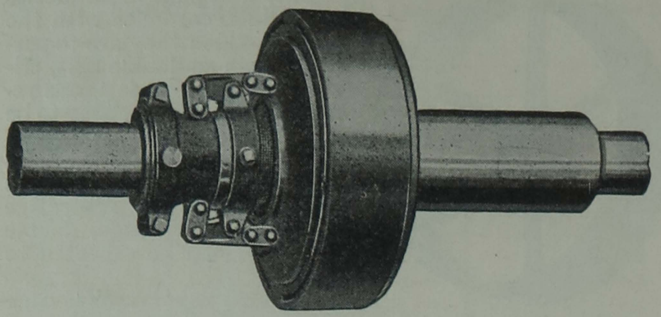
When pulleys are required with bores so small as to necessitate special machine fixtures, or involve extra labor, an additional charge will be made.

Odd Bores

For pulleys with bores involving fractions less than 1/16 inch, or metric sizes, or bored to gauges furnished, an extra charge will be made.

Prices and further information upon application

Dodge Solid Friction Clutches



This clutch is of the friction disc type, simple in construction, easy to adjust and operate, and adaptable for all clutch requirements within the range of sizes.

It is made for use as a cut-off coupling, connecting two shafts, or with loose sleeves on which is mounted a pulley, gear or sprocket. Three types of sleeves can be furnished.

Plain cast iron sleeves are bored and reamed to shaft size, have helical grooves for lubrication and are tapped for grease cups; used when speeds and loads are normal.

Bronze bushed sleeves are of cast iron with bronze lining properly grooved and tapped for grease lubrication. Used when speeds are high and clutch is disengaged for long periods of time.

Capillary oiling bronze bushed sleeves are provided with an oil chamber from which oil is evenly distributed to the shaft through soft wood plugs inserted in the bronze bushing. Used when operating conditions require a constant and dependable supply of lubricant with minimum attention.

Friction surfaces are the end grain of hard wood blocks, or ring facings of woven asbestos. Either can be furnished and are interchangeable.

Toggle mechanism as shown is regularly furnished on all sizes 7-inch and over, and taper sliding collar mechanism on smaller sizes, and on all sizes when arranged duplex.

With Wood Blocks

Prices include shifter yoke without lever, and one shaft collar.

Weights are net for bored sleeves of standard length. Add 20 per cent for shipping weight when boxed; 4 to 10-inch sizes are boxed when shipped separate.

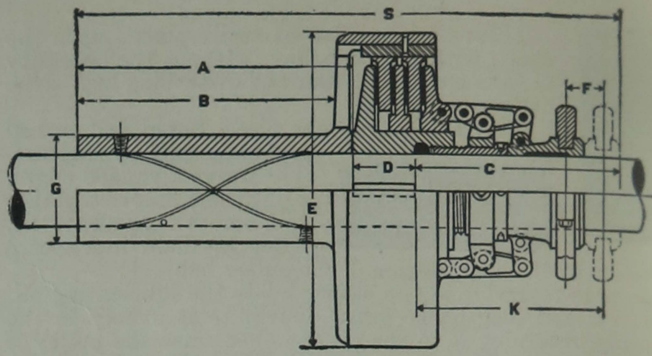
*Furnished with cast iron rings, not wood blocks.

Clutch Size Inches	Max. Bore Inches	Equiv. Shaft Inches	H.P. at 100 R.P.M.	Max. Speed R.P.M.	Std. Length Sleeve Inches	Wt. Lbs. with Bored Sleeve
*4	1 1/4	1	1 1/4	600	4 1/2	22
*5	1 1/2	1 3/16	2	600	5	35
*6	1 3/4	1 3/8	3	600	6	55
7	2	1 1/2	4	550	7	67
8	2 1/4	1 5/8	5	550	8	80
9	2 1/2	1 11/16	6	500	10	112
10	3	2	10	500	11	125
12	3	2 5/16	15	450	12	200
12 Spl.	4	2 5/16	15	450	12	210
14	3 1/2	2 15/16	30	400	13	230
14 Spl.	5	2 15/16	30	400	13	260
16	4 1/2	3 7/16	50	350	14	380
16 Spl.	6	3 7/16	50	350	14	440

	Clutch Complete—Price Each					
	Bored Iron Sleeve		Bronze Bushed Sleeve		Capillary Oiling Sleeve	
Clutch Size Inches	Standard Length	Each Inch Additional	Standard Length	Each Inch Additional	Standard Length	Each Inch Additional
*4	$25.00	$1.50	$29.00	$1.60	$33.00	$1.70
*5	28.00	1.60	33.00	1.70	38.00	1.80
*6	32.00	1.70	39.00	1.90	44.00	2.30
7	34.00	1.90	42.00	2.50	47.00	2.90
8	40.00	2.00	52.00	3.20	56.00	3.60
9	46.00	2.10	62.00	4.00	66.00	4.40
10	54.00	2.40	74.00	4.50	80.00	5.00
12	66.00	2.60	88.00	4.80	94.00	5.60
12 Spl.	80.00	4.00	107.00	5.40	117.00	6.40
14	85.00	3.00	111.00	6.00	125.00	7.00
14 Spl.	105.00	4.50	139.00	6.60	149.00	7.70
16	150.00	3.50	185.00	7.20	191.00	8.40
16 Spl.	175.00	5.00	219.00	7.80	231.00	9.00

Dodge Solid Friction Clutches

Dimensions



Clutch	Max. Bore. In.		Dimensions, Inches							
In.	Reg.	Spec.	A	B	C	D	E	F	K	S
4	1 1/4	.	4 1/2	4	4 3/4	1 1/2	5 3/8	3/4	4 3/8	10 3/4
5	1 1/2	.	5	4 1/2	4 3/4	1 3/4	6 1/2	3/4	4 3/8	11 1/2
6	1 3/4	.	6	5 1/2	6 3/8	1 7/8	7 11/16	1 1/4	5 7/8	14 1/4
7	2	.	7	6 1/4	6 7/8	2 1/8	8 7/8	1 1/4	6 3/8	16
8	2 1/4	.	8	7 1/4	7 1/2	2 1/4	10 1/8	1 1/2	7	17 3/4
9	2 1/2	.	10	9 1/4	7 5/8	2 3/8	11 3/8	1 1/2	7	20
10	3	.	11	10 1/4	7 1/2	2 1/2	12 5/8	1	6 7/8	21
12	3	4	12	11	8 1/2	2 3/4	15 1/8	1 1/4	7 3/4	23 1/4
14	3 1/2	5	13	12	9	3	17 5/8	1 1/4	8 1/8	25
16	4 1/2	6	14	13	9 7/8	4 1/8	19 1/2	1 1/2	9	28

For diameter of sleeve G see table below.

Sleeve Diameters and Weights

Bored Iron Sleeve

			Weights	
Sleeve Diam. Inches	Sleeve Keyseat Inches	Limits Shaft Size Inches	Bore Inches	Pounds per Inch
2 7/16	5/8x3/16	15/16-1 1/2	1 7/16	.7
2 15/16	3/4x3/16	1 9/16 -2	1 15/16	1.0
3 7/16	7/8x1/4	2 1/16 -2 1/4	2 3/16	1.4
3 15/16	1 x1/4	2 5/16 -2 1/2	2 7/16	1.9
4 7/16	1 1/8x1/4	2 9/16 -3	2 15/16	2.2
4 15/16	1 1/4x1/4	3 1/16 -3 1/2	3 7/16	2.5
5 7/16	1 3/8x1/4	3 9/16 -4	3 15/16	2.8
5 15/16	1 1/2x1/4	4 1/16 -4 1/2	4 7/16	3.1
6 1/2	1 3/4x1/4	4 9/16 -5	4 15/16	3.6
7	1 3/4x1/4	5 1/16 -5 1/2	5 7/16	3.9
7 1/2	2 x3/8	5 9/16 -6	5 15/16	4.2

Bronze Bushed Sleeve

2 7/16	5/8x3/16	15/16-1 1/2	1 7/16	.8
2 15/16	3/4x3/16	1 9/16 -1 3/4	1 11/16	1.2
3 7/16	7/8x1/4	1 13/16-2	1 15/16	1.6
3 15/16	1 x1/4	2 1/16 -2 1/4	2 3/16	2.2
4 7/16	1 1/8x1/4	2 5/16 -2 3/4	2 7/16	2.9
4 15/16	1 1/4x1/4	2 13/16-3 1/4	2 15/16	3.3
5 7/16	1 3/8x1/4	3 5/16 -3 3/4	3 7/16	3.8
5 15/16	1 1/2x1/4	3 13/16-4 1/4	3 15/16	4.2
6 1/2	1 3/4x1/4	4 5/16 -4 3/4	4 7/16	4.8
7	1 3/4x1/4	4 13/16-5 1/4	4 15/16	5.2
7 1/2	2 x3/8	5 5/16 -5 3/4	5 7/16	5.7
8	2 x3/8	5 13/16-6	5 15/16	6.1

Capillary Oiling Sleeve

2 15/16	3/4x3/16	15/16-1 1/4	1 3/16	1.2
3 7/16	7/8x1/4	1 5/16 -1 3/4	1 11/16	1.5
3 15/16	1 x1/4	1 13/16-2	1 15/16	2.1
4 7/16	1 1/8x1/4	2 1/16 -2 1/4	2 3/16	2.7
4 15/16	1 1/4x1/4	2 5/16 -2 3/4	2 7/16	3.4
5 7/16	1 3/8x1/4	2 13/16-3 1/4	2 15/16	3.9
5 15/16	1 1/2x1/4	3 5/16 -3 3/4	3 7/16	4.3
6 1/2	1 3/4x1/4	3 13/16-4 1/4	3 15/16	5.0
7	1 3/4x1/4	4 5/16 -4 3/4	4 7/16	5.4
7 1/2	2 x3/8	4 13/16-5 1/4	4 15/16	5.9
8	2 x3/8	5 5/16 -5 3/4	5 7/16	6.4
8 1/2	2 1/4x3/8	5 13/16-6	5 15/16	6.9

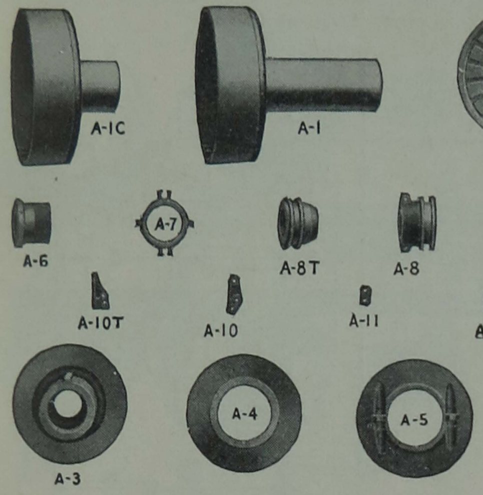
All sleeves have two tapped holes and helical oil grooves as indicated. One grease cup and pipe with one pipe plug are furnished on sizes 4 to 7 inclusive.

Standard length of sleeves is shown as A dimension above.

Sleeve diameters other than standard are subject to an extra charge.

Keyseats in sleeves for pulleys are standard sizes for sleeve diameters as shown above. Sleeves for clutches 4 to 9 inches inclusive are not keyseated.

Parts of Dodge Solid Friction Clutches



A-1	Casing with Sleeve for Pulley
A-1C	Casing with Hub for Coupling
A-2	Wood or Asbestos Filled Discs
A-3	Inside Friction Plate
A-4	Intermediate Friction Plate
A-5	Outside Friction Plate
A-6	Adjusting Ring
A-7	Toggle Fulcrum Ring
A-8T	Sliding Collar 6-Inch Clutch and Less
A-8	Sliding Collar 7-Inch Clutch and Up
A-9	Thrust Collar
A-10T	Toggle Lever Used with A-8T
A-10	Toggle Lever Used with A-8
A-11	Links for A-5 and A-10T or A-10
A-12	Links for A-8 and A-10
A-13	Pins for A-10–11–12

Number of Parts Required for One Clutch and Prices for One Piece Only

	Name of Part						
Clutch Inches	A-1C A-1	A-2 (Blks.)	A-2 (Rings)	A-3	A-4	A-5	A-6
Parts	1	3	3	1	2	1	1
4	$8.40	$1.00	$5.40	$3.80	$.80	$.80	$1.20
5	9.00	1.40	5.70	4.40	1.00	1.00	1.40
6	10.20	1.60	6.20	4.60	1.50	1.30	1.70
Parts	1	2	2	1	1	1	1
7	13.00	2.00	6.80	5.20	1.60	1.80	1.80
8	14.80	2.20	8.10	6.50	2.30	2.00	2.10
9	19.20	2.60	9.10	8.10	2.50	2.40	2.50
10	21.20	3.40	11.10	9.30	3.40	2.90	2.70
12	26.00	4.70	15.00	11.80	4.50	3.90	3.00
14	31.60	5.70	20.00	15.40	6.80	5.70	3.70
Parts	1	3	3	1	2	1	1
16	64.00	7.80	25.00	25.20	9.20	7.20	7.20

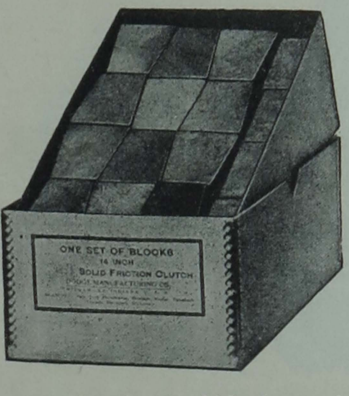
	Name of Part						
Clutch Inches	A-7	A-8T A-8	A-9	A-10T A-10	A-11	A-12	A-13
Parts	1	1	1	2	4	...	6
4	$1.40	$1.40	$1.60	$.20	$.20	...	$.05
5	1.60	1.70	1.60	.20	.20	...	.05
6	1.20	1.50	1.40	.25	.20	...	.05
Parts	1	1	1	2	4	4	10
7	1.30	2.00	1.60	.25	.20	$.25	.05
8	1.50	2.30	1.60	.30	.20	.25	.05
9	1.50	2.40	1.90	.30	.20	.25	.05
10	2.10	3.40	2.00	.35	.20	.25	.10
12	2.50	4.00	3.00	.40	.20	.25	.10
14	4.10	5.10	3.00	.65	.25	.30	.15
Parts	1	1	1	3	6	6	15
16	5.00	7.30	3.60	.65	.25	.30	.20

When ordering parts, give size of clutch, symbol as shown above, shaft size on bored parts, diameter and length of sleeve. Specify if A-2 parts are for blocks or woven rings. For price of A-2 parts with asbestos blocks, add to price of A-2 part with wood blocks the proportionate part of price per set of asbestos blocks.

When A-1C is used to connect shafts of different diameter, add 10 per cent of price of complete coupling.

Duplex A-8T is twice the price of single shown above.

Friction Blocks and Rings for Dodge Solid Friction Clutches

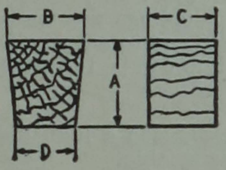


Wood blocks for clutches are made of hard maple, cut to size, and fitted in clutch rings with end grain of wood exposed for wearing surfaces.

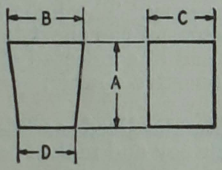
Under ordinary service conditions they are entirely satisfactory, and solid clutches will be fitted with them unless otherwise specified.

Asbestos blocks are made of asbestos fibre interwoven with brass wire, mixed with a binder, and subjected to heavy pressure. The finished blocks are hard and durable, and will not burn or wear excessively. They should be used when clutch must pick up heavy loads, operate at high speeds or at frequent intervals, where difficult to reach for adjustment, or where a fire hazard exists.

Asbestos friction rings are woven of asbestos fibre and brass wire and molded or cut to size. Faces of rings are ground smooth and parallel, giving a greater friction area and better wearing qualities than the asbestos blocks. These are attached to cast iron clutch ring with brass rivets making them easily replaced. Price includes rivets.



Wood Block



Asbestos Block

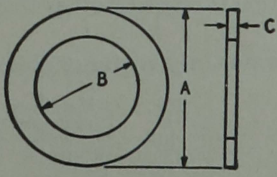
Wood Blocks

Clutch Size Inches	No. per Set	Dimensions, Inches A	B	C	D	Weight Pounds per Set	Price per Set
7	28	1	1¼	¾	⅞	¾	$.60
8	32	1	1¼	¾	⅞	¾	.70
9	34	1	1¼	¾	⅞	1	.80
10	36	1½	1⅜	13/16	15/16	1½	.90
12	42	1½	1⅜	13/16	15/16	1¾	1.10
14	44	2	1½	⅞	1 1/16	2¾	1.50
16	72	2	1½	⅞	1 1/16	4½	2.40

Asbestos Blocks

Clutch Size Inches	No. per Set	A	B	C	D	Weight Pounds per Set	Price per Set
7	28	¾	1	¾	⅞	1¾	$11.80
8	32	¾	1	¾	⅞	2	13.50
9	34	1	1	¾	⅞	2¼	14.40
10	36	1½	1½	13/16	15/16	4	19.60
12	42	1¾	1½	13/16	15/16	4¾	22.80
14	44	2¾	2	⅞	1 1/16	7½	30.60
16	72	4½	2	⅞	1 1/16	12	50.00

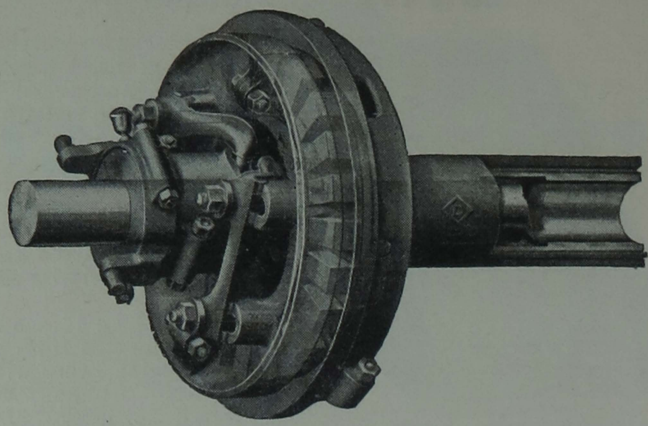
Asbestos Rings



Clutch Size Inches	No. per Set	A	B	C	D	Weight Pounds per Set	Price per Set
4	6	4	2½	⅛	..	½	$3.60
5	6	5	3¼	⅛	..	½	3.80
6	6	6	4	⅛	..	¾	4.00
7	4	7	4¾	⅛	..	¾	3.00
8	4	8	5½	⅛	..	1	4.00
9	4	9	6¼	⅛	..	1¼	5.00
10	4	10	6½	⅛	..	2	6.00
12	4	12	8	3/16	..	3½	9.00
14	4	14	9½	3/16	..	4½	11.00
16	6	16	11	3/16	..	8	20.00

No blocks are used in 4, 5 and 6-inch clutches. They are provided with cast iron plates.

Dodge Split Friction Clutches



Friction clutches are an important item of power transmission equipment and the successful application of Dodge Split Friction Clutches for many years has proved their value in this field.

They are made in 16 sizes ranging in capacity from 6 h.p. to 1000 h.p. at 100 r.p.m., and may be depended upon to give the maximum of clutch service.

All parts are split and the clutch can be installed after shaft is in place. Replacements are easily made when necessary. The hubs for cut-off couplings are made solid because of the short length on shaft and to act as a bearing for end of connected shaft. This hub can be furnished split at an extra charge.

Standardized manufacture has produced a high degree of accuracy and makes parts interchangeable.

The friction surfaces are hard maple or beech wood blocks set in the cast iron ring or A Part which is mounted on sleeve or hub, and two finished cast iron rings running in contact with end grain of wood blocks, and attached to the shaft through key in B Part. The powerful toggle mechanism forces these parts together, thus connecting by frictional resistance the driving shaft with the driven unit mounted on the sleeve.

Each clutch is assembled and balanced for a normal speed before leaving the factory.

Sleeves are furnished of various diameters and lengths to fit different shaft and clutch sizes, and are lined with bearing metal, bronze, or made capillary oiling. Grease cups are furnished on lined sleeves.

The power rating of Dodge Clutches is conservative, with a liberal margin to care for ordinary variations in load.

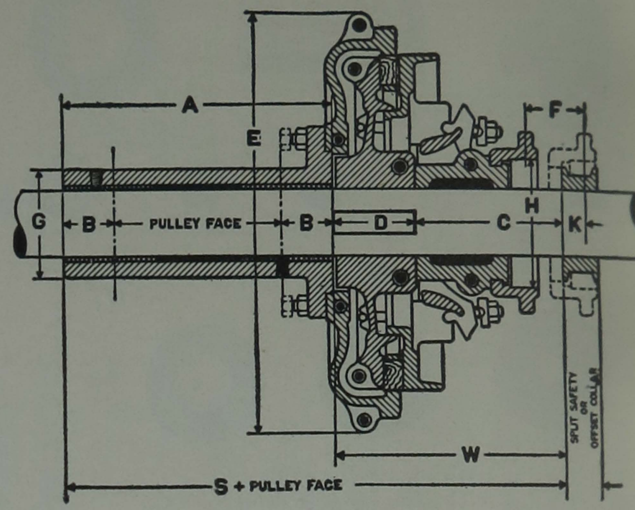
Any type of belt pulley, sheave for ropes or V belts, sprocket, or gear, may be mounted on clutch sleeves. No special construction is required other than large bore to suit sleeve.

Mechanisms Only without Sleeves or Quills

Size Clutch Inches	Each	H.P. at 100 R.P.M.	Max. Speed at Regular Prices R.P.M.	Largest Possible Bore Inches	Approx. Weight Pounds
10	$38.50	6	450	2½	100
12	45.50	10	440	3	150
14	54.50	15	430	3½	200
16	70.00	20	420	4½	250
18	90.00	25	410	5	320
20	110.00	32	400	6	390
22	135.00	40	390	6	475
24	155.00	50	380	6½	550
28	190.00	80	360	7	725
30	238.00	100	350	7½	900

Dodge Split Friction Clutches

Dimensions



Clutch Inches	Dimensions, Inches A	B	C	D	E
10	Pulley Face+2B= Total Length of Sleeve	2½	6⅞	3¾	14
12		2½	7 13/16	3¾	17
14		2½	8½	4¼	19
16		3	8¾	4¼	21
18		3	8⅞	4⅛	23
20		3	8 13/16	4¾	25½
22		3	9⅛	4⅝	27
24		3	9⅝	4¾	29¼
28		3½	11	5½	34¼
30		3½	11½	7¼	34
36			11	7⅞	40¼
42		Use Quills Not Sleeves	12⅞	9⅞	48
48			13⅝	11	54
54			16	12⅜	60½
60			16½	13⅝	67¾
72			20¾	16	83

Clutch Inches	Dimensions, Inches F	G	H	K	S	W
10	2¼	....	4½	1	15⅝	10⅝
12	2⅝	....	4½	1¾	16 9/16	11 9/16
14	3	....	5⅞	¾	17¾	12¾
16	3	....	6	1⅜	19	13
18	3⅝	....	7	⅞	19	13
20	3⅝	....	7¾	1	19 9/16	13 9/16
22	4⅜	....	8¼	1¼	19¾	13¾
24	4⅜	....	8⅝	1⅜	20⅜	14⅜
28	5½	....	9¾	1	23½	16½
30	6½	....	9¾	1¼	25¾	18¾
36	7	——	11⅛	1⅞	——	18⅞
42	8⅞		11¾	2 1/16		22¾
48	9⅜	Use Quills	14½	1⅞	Use Quills	24⅝
54	11		14¾	1⅝		28⅜
60	11		14½	1¾		30⅛
72	13¼		19½	2		36¾

For clutches over 30 inches quills are recommended in place of sleeves.

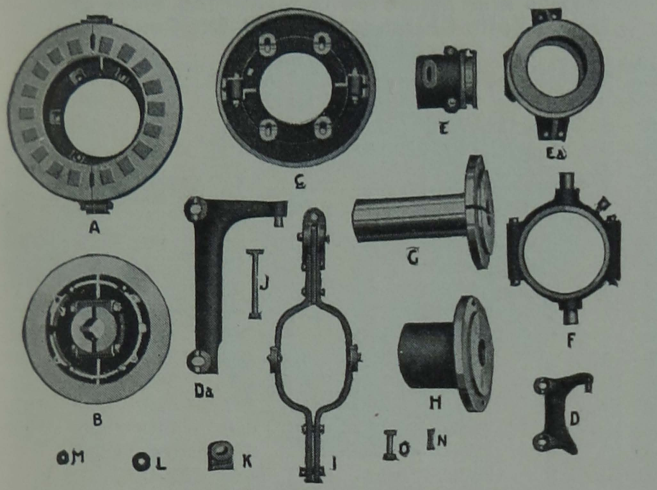
Off-Set Collars and Special E Parts for Dodge Split Friction Clutches and Cut-Off Couplings

When clutches are bored near the maximum shaft size the regular split collar is of greater diameter than the H diameter of F ring, here shown, and an off-set collar must be used.

Size Clutch Inches	Size Shafts Requiring Off-set Stop Collars, Inclusive, In.	Width Collar Inches	Size Clutch Inches	Size Shafts Requiring Off-set Stop Collars, Inclusive, In.	Width Collar Inches
*10	2 3/16 to 2½	...	28	6 3/16 to 7	5½
*12	2 3/16 to 3	...	30	6 3/16 to 7½	5¾
*14	3 3/16 to 3½	...	36	6 15/16 to 8	5¾
16	3 3/16 to 4½	4¼	42	7 15/16 to 10	6
18	3 11/16 to 5	5	48	9 11/16 to 10	6
20	4 3/16 to 6	5	54	9 11/16 to 12	6
22	4 11/16 to 6	5	60	9 11/16 to 12	6
24	4 11/16 to 6½	5	..	....	...

*Special E parts.

Parts of Dodge Split Friction Clutches



A or Ao—Wood Filled Disc
B—Inside Friction Plate
C—Outside Friction Plate
D—Lever
E and Ea—Sliding Collar
F—Thrust Collar
G—Sleeve for Pulley
H—Cut off Coupling Hub
I—Shifter Yoke
J—Draw Bolt
K—Link for Ea
L and M—Washer and Nut for J
N—Springs between B and C
O—Bolts for G and H to A

When ordering give size of clutch, symbol shown above, shaft size on bored parts, diameter and length of sleeve.

Number of Parts Required for One Clutch and Prices for One Piece Only

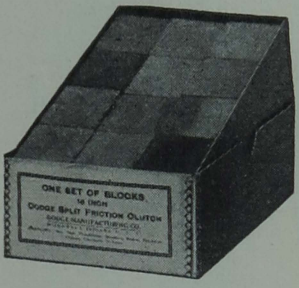
Clutch In.	Name of Part A	B	C	D	E	Ea	F	I
Parts—	1	1	1	2	1		1	1
10	$15.60	$10.45	$7.75	$1.10	$5.05	$....	$4.20	$6.50
12	17.90	12.80	9.25	1.40	5.90	.....	4.80	6.50
14	25.15	13.80	11.50	1.85	6.85	.....	4.80	7.00
16	30.95	20.75	15.60	2.35	9.00	.....	6.00	7.00
18	41.05	27.95	20.80	3.20	10.50	.....	8.00	7.60
20	52.90	35.00	26.00	3.70	13.40	.....	8.10	7.60
22	63.35	46.10	32.90	4.40	16.80	.....	9.60	8.30
24	73.60	54.65	38.80	4.85	17.80	.....	11.50	8.30
28	88.10	71.70	48.70	6.85	18.70	.....	12.70	9.10
Parts—	1	1	1	2	.....	1	1	1
30	109.10	91.85	57.10	9.70	.....	25.55	14.80	9.50
36	144.55	129.00	83.05	11.40	.....	26.40	16.50	9.90
42	188.30	164.10	98.30	15.95	.....	28.90	18.65	....
48	230.40	202.70	118.40	17.60	.....	29.65	19.55	....
Parts—	1	1	1	3	.....	1	1	.....
54	280.45	254.05	138.80	17.90	.....	33.85	20.90	....
60	343.80	316.75	210.95	22.50	.....	36.60	23.60	....
Parts—	1	1	1	4	.....	1	1	.....

72 Prices on application.

Clutch In.	Name of Part J	K	L	M	N No.	N Price	O Size	O Price
Parts—	4	....	4	4	4	.....	......	.....
10	$.90	...	$.15	$.08	4	$.13	6— 1/2	$.12
12	1.00	...	.15	.08	4	.14	6— 1/2	.14
14	1.00	...	.20	.10	4	.15	6— 1/2	.16
16	1.15	...	.25	.10	4	.15	6— 5/8	.20
18	1.25	...	.30	.12	4	.17	6— 5/8	.22
20	1.25	...	.35	.12	4	.17	6— 5/8	.24
22	1.45	...	.40	.15	4	.18	6— 5/8	.26
24	1.65	...	.45	.15	4	.18	6— 5/8	.28
28	2.00	...	.50	.20	4	.23	6— 3/4	.30
Parts—	4	2	4	4	...	.....	......	.....
30	2.25	.40	.75	.20	4	.23	6— 3/4	.35
36	2.35	.50	.90	.25	6	.25	6— 7/8	.45
42	2.50	.60	.95	.25	8	.27	6—1	.55
48	2.70	.65	1.00	.35	12	.30	6—1	.60
Parts—	6	3	6	6	...	.....	......	.....
54	2.75	.85	1.15	.35	12	.35	6—1	.65
60	3.35	.95	1.50	.50	16	.40	8—1 1/4	1.30
Parts—	8	4	8	8	20	.....	8—1 1/2	.....

72 Prices on application.

Friction Blocks for Dodge Split Friction Clutches



Wood blocks for clutches are made of hard maple, cut to size, and fitted in clutch rings with end grain of wood exposed for wearing surfaces.

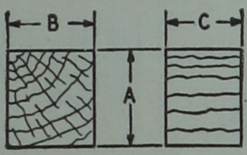
Blocks should be kept dry and free from oil and grease to secure the best results.

Under ordinary service conditions they are entirely satisfactory, and Dodge split clutches will be fitted with them unless otherwise specified.

Asbestos blocks are made of asbestos fibre interwoven with brass wire, mixed with a binder, and subjected to heavy pressure. The finished blocks are hard and durable, and will not burn or wear excessively. They should be used when clutch must pick up heavy loads, operate at high speeds or at frequent intervals, where difficult to reach for adjustment, or where a fire hazard exists.

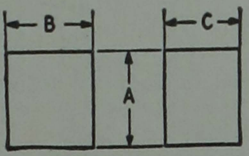
Blocks are put up in cartons as illustrated, each carton containing one complete set of blocks of proper size for clutch.

Wood Blocks



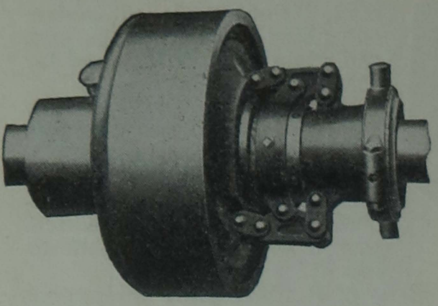
Size Clutch Inches	No. of Blocks per Set	Dimensions Inches A	B	C	Weight Pounds per Set	Price per Set
10	16	1 1/8	1	7/8	1/2	$.60
12	14	1 9/16	1 3/8	15/16	1	.60
14	16	1 7/8	1 27/64	1 1/16	1 1/2	1.00
16	18	1 29/32	1 1/2	1 1/8	2	1.00
18	22	1 13/16	1 1/2	1 1/8	2	1.30
20	26	1 13/16	1 1/2	1 1/8	2 1/2	1.50
22	26	1 31/32	1 5/8	1 1/8	3	1.50
24	26	2 3/8	1 11/16	1 1/4	4	1.70
28	30	2 5/8	1 23/32	1 1/4	5	1.90
30	32	2 17/32	1 3/4	1 1/4	5	2.00
36	38	2 3/4	1 63/64	1 1/2	9	2.50
42	42	3 3/32	2	1 3/4	12	3.30
48	42	3 1/2	2 13/32	2	19	4.50
54	56	4 1/8	2	2 1/8	27	6.00
60	56	4 3/16	2 1/4	2 3/8	34	7.50
72	60	5	2 1/2	2 7/8	56	10.00

Asbestos Blocks



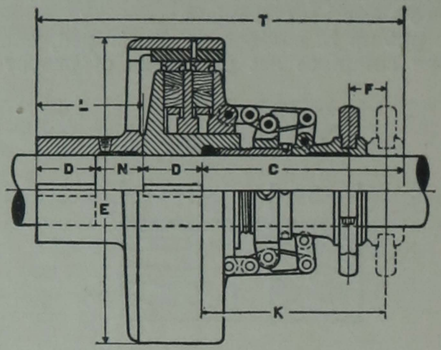
Size Clutch Inches	No. of Blocks per Set	Dimensions Inches A	B	C	Weight Pounds per Set	Price per Set
10	16	1 1/8	31/32	7/8	1 1/2	$4.25
12	14	1 37/64	1 25/64	15/16	2 1/2	5.25
14	16	1 57/64	1 27/64	1 1/16	4	7.00
16	18	1 57/64	1 31/64	1 1/8	5	8.25
18	22	1 13/16	1 7/16	1 1/8	6	10.00
20	26	1 51/64	1 1/2	1 1/8	7	11.75
22	26	1 15/16	1 19/32	1 1/8	8	12.50
24	26	2 3/8	1 21/32	1 1/4	11	16.25
28	30	2 37/64	1 11/16	1 1/4	14	20.25
30	32	2 17/32	1 3/4	1 1/4	16	25.00
36	38	2 3/4	1 61/64	1 1/2	26	33.50
42	42	3 3/32	2	1 3/4	38	42.25
48	42	3 1/2	2 13/32	2	58	63.50
54	56	4 1/8	2	2 1/8	80	87.25
60	56	4 3/16	2 1/4	2 3/8	102	124.00
72	60	5	2 1/2	2 7/8	175	235.00

Dodge Solid Friction Cut-Off Couplings



The equivalent shaft size shown in the table is based on ordinary line shaft service. A friction cut-off coupling should always have a power rating equal to or greater than the shafts connected. If the starting load is heavy, or speed is high, a larger clutch should be used.

Speeds shown are the maximum for clutches as regularly built. Clutches for higher speeds furnished at an extra charge



Clutch Inches	Dimensions, Inches C	D	E	F	K	L	N	T
4	4¾	1½	5⅜	¾	4⅜	2¾	1¼	9
5	4¾	1¾	6½	¾	4⅜	3⅛	1⅜	9⅝
6	6⅜	1⅞	7 11/16	1¼	5⅞	3⅜	1½	11⅝
7	6⅞	2⅛	8⅞	1¼	6⅜	3¾	1⅝	12¾
8	7½	2¼	10⅛	1½	7	4	1¾	13¾
9	7⅝	2⅜	11⅜	1½	7	4¼	1⅞	14¼
10	7½	2½	12⅝	1	6⅞	4½	2	14½
12	8½	2¾	15⅛	1¼	7¾	5	2¼	16¼
14	9	3	17⅝	1¼	8⅛	5½	2½	17½
16	9⅞	4⅛	19½	1½	9	6⅞	2¾	20⅞

Clutch Size Inches	Max. Bore Inches	Equiv. Shaft Inches	H.P. at 100 R.P.M.	Speed R.P.M.	Net Weight Pounds	*Price, Each Wood Blocks	Asb. Rings
4	1¼	1	1¼	600	21	**$25.00**	**$35.00**
5	1½	1 3/16	2	600	35	**28.00**	**38.00**
6	1¾	1⅜	3	600	52	**32.00**	**42.00**
7	2	1½	4	550	65	**34.00**	**43.00**
8	2¼	1⅝	5	550	80	**40.00**	**50.00**
9	2½	1 11/16	6	500	110	**46.00**	**57.00**
10	3	2	10	500	125	**54.00**	**67.00**
12	3	2 5/16	15	450	190	**66.00**	**84.00**
14	3½	2 15/16	30	400	230	**85.00**	**109.00**
16	4½	3 7/16	50	350	380	**150.00**	**189.00**

*When coupling connects shafts of different diameters an additional charge of 10 per cent will be made. Hub diameter must be for the larger shaft.

Bronze Bushings

If bronze bushings are wanted in hub for end of shaft which runs free when clutch is thrown out (dimension N), add prices shown below.

Diam., In. Shaft	Hub	Thick. In.	Price Each	Diam., In. Shaft	Hub	Thick. In.	Price Each
1¼	2½	⅛	**$5.40**	**3½**	6½	¼	**$15.00**
1½	3	⅛	**6.60**	**3¾**	7	¼	**16.20**
1¾	3¼	⅛	**7.50**	**4**	7½	¼	**17.10**
2	3¾	⅛	**8.40**	**4¼**	7¾	¼	**18.30**
2¼	4¼	3/16	**9.60**	**4½**	8	¼	**19.50**
2½	4¾	3/16	**10.80**	**4¾**	8¼	¼	**21.60**
2¾	5¼	3/16	**12.00**	**5**	8½	¼	**22.50**
3	5½	3/16	**12.90**	**5½**	9	¼	**24.00**
3¼	6	¼	**14.10**	**6**	9½	¼	**27.00**

Dodge Split Friction Clutches

Tables and Rules for Determining Sizes of Dodge Split Clutches and Cut-Off Couplings

Clutch Size Inches	Max. Bore In.	Equiv. Shaft In.	Power Constant	H.P. Capacities at Various R.P.M. 100	150	200	250	300	350
10	2½	1¾	7571	6	8	11	13	15	17
12	3	2	12605	10	14	18	22	25	28
14	3½	2¼	18908	15	21	27	33	37	42
16	4½	2½	25210	20	28	36	43	50	56
18	5	2¾	31513	25	36	45	54	62	70
20	6	3	40336	32	46	58	69	80	90
22	6	3¼	50420	40	57	73	87	100	112
24	6½	3½	63025	50	72	91	108	125	140
28	7	4	100840	80	115	146	174	200	224
30	7½	4¼	123529	100	143	182	217	250	280
36	8	4½	161344	130	186	237	282	325	364
42	10	5	219327	175	250	319	380	438	*490
48	10	5½	305041	240	343	437	520	600	*670
54	12	6	428570	340	486	618	740	*850	*950
60	12	7	605040	500	715	910	1085	*1250	...
72	15	9	1260000	1000	1430	1820	*2170	....	...

Clutch Size Inches	H.P. Capacities at Various R.P.M. 400	450	500	550	600	700	800	900	...
10	18	20	*21	*23	*24	*26	*28	*30	...
12	31	33	*36	*38	*40	*44	*47	*50	...
14	46	50	*54	*57	*60	*66	*71	...	...
16	62	*67	*71	*76	*80	*88	...	...	...
18	77	*83	*89	*95	*100	*110	...	...	...
20	99	*107	*114	*121	*128	...	...	...	...
22	123	*133	*143	*152	...	...	...	...	...
24	154	*167	*178	*190	...	...	...	...	...
28	*246	*266	*286	...	...	...	...	...	...
30	*308	*333	...	...	...	...	...	...	...
36	*400	*433	...	...	...	...	...	...	...
42	*540	...	...	...	...	...	...	...	...

*Clutch must have special balance for speed.

If shaft is larger than maximum bore of clutch selected, a larger clutch must be used.

When initial starting load is heavy, or load fluctuates violently, add 100% to capacity. For 1-cylinder gas or oil engines or compressor service, add 100%; for 2-cylinder engines add 50%; for 4-cylinder engines add 25%.

If average number of times clutch is operated is once per hour or more, then add 2% to required h.p. for each operation per hour.

The column of power constants can be used in selecting clutch for gears, sprockets and sheaves. Multiply diameter in inches by total pull in pounds, find power constant equal to this product and read clutch size at left. Check this clutch size for maximum bore, r.p.m., and service conditions.

Cut-off coupling capacity should equal or exceed capacity of the shafts connected. See above table, column 3.

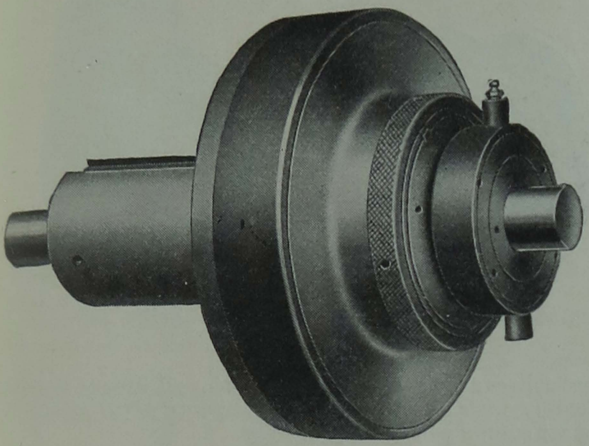
Maximum Pulley Diameter for Different Face Widths and Belt Tensions

Clutch Size Inches	Max. Bore In.	Double Belt—60 Pounds Per Inch 3	4	5	6	8	10	12	14	16	18
10	2½	42	32	24	20	14	12	..	..	..	..
12	3	..	52	42	34	26	20	16	..	..	..
14	3½	..	..	62	52	38	30	26	22	..	..
16	4½	..	..	..	70	52	42	34	30	26	..
18	5	..	..	..	..	66	52	44	36	32	28
20	6	..	..	..	..	..	66	56	48	42	36
22	6	..	..	..	..	..	..	70	60	52	46
24	6½	..	..	..	..	..	..	..	72	64	58
28	7	..	..	..	..	..	..	..	..	..	90

Clutch Size Inches	Max. Bore In.	Heavy Double Belt—90 Pounds Per Inch 3	4	5	6	8	10	12	14	16	18
10	2½	28	20	16	14	10	..	..	..	..	..
12	3	46	34	28	22	16	14	..	..	..	..
14	3½	..	52	42	34	26	20	16	..	..	..
16	4½	..	..	56	46	34	28	22	20	..	..
18	5	..	..	70	58	42	34	28	24	20	..
20	6	..	..	..	74	56	44	36	32	28	24
22	6	..	..	..	..	70	56	46	40	34	30
24	6½	..	..	..	..	..	70	58	50	42	38
28	7	..	..	..	..	..	..	90	80	70	62

Dodge Diamond D Friction Clutches

For Heavy Duty Service



The service required of a friction clutch is more severe than is generally realized. The many conditions of service found in industry require clutches of several types.

In order to insure successful clutch operation, it is necessary to select the proper type to accommodate the particular conditions under which it is expected to operate. Due consideration must also be given to clutch capacity which must be equal or greater than actually required. Proper installation and care are also of great importance.

The Diamond D clutch is manufactured in a variety of types, each one adapted to meet different service requirements.

Every feature of Diamond D clutch design has been carefully checked against the requirements of power users and machine builders to the end that every requisite for efficient, dependable performance has been provided.

The Diamond D clutch is completely enclosed in both engaged and disengaged positions. This affords complete protection against dust and dirt and there are no exposed parts to catch clothing and injure workmen. The safety feature of this clutch is of great importance and has been responsible for its adoption in many industrial plants.

Bolted Plate Mechanism

Single Plate

Recommended for shock or pulsating loads and for many types of heavy duty machinery as the mechanism can be readily connected to the driven unit—pulley, sheave, flywheel, etc.

The clutch is furnished without a sleeve, and the steel plate, upon which the friction discs are mounted, is bolted directly to the driven unit. This method of connection eliminates all back lash, making the clutch particularly suitable for road and oilfield machinery. It is also suitable for low speed internal combustion engines having only one or two cylinders and for service where reversal of torque is frequent.

The bolted plate is furnished split and can be readily removed and new friction discs applied without stripping mechanism from the shaft.

Bronze Slip Ring	Ball Bearing Slip Ring	H.P. 100 R.P.M.	Torque Inch Pounds	Max. Bore In.	Weight Pounds
3A60 **$35.00**	3A65 **$40.00**	1½	945	1½	26
5A60 **45.00**	5A65 **50.00**	2½	1575	2	42
10A60 **60.00**	10A65 **70.00**	7½	4727	2½	80
15A60 **100.00**	15A65 **115.00**	20	12605	3	155
25A60 **215.00**	25A65 **240.00**	40	25210	4	285
50A60 **385.00**	50A65 **425.00**	70	44117	5	490
100A60 **700.00**	100A65 **800.00**	125	78781	7	1020

Gear Tooth Mechanism

Single Plate

Recommended for a wide variety of service and for general transmission. The clutch is manufactured to conform to the high standard of quality established by machinery builders. It is suitable for mounting on extension shafts of high speed multi-cylinder internal combustion engines and for any service which does not have unusually severe shock loads or frequent reversal of torque.

Internal Driving Ring		External Driving Ring					
Bronze Slip Ring	Ball Bearing Slip Ring	Bronze Slip Ring	Ball Bearing Slip Ring	H.P. 100 R.P.M.	Torque Inch Pounds	Max. Bore In.	Wt. Lbs.
3A140 **$45.00**	3A145 **$50.00**	3A140X **$45.00**	3A145X **$50.00**	1½	945	1½	30
5A140 **55.00**	5A145 **60.00**	5A140X **55.00**	5A145X **60.00**	2½	1575	2	50
10A140 **75.00**	10A145 **85.00**	10A140X **75.00**	10A145X **85.00**	7½	4727	2½	95
15A140 **130.00**	15A145 **145.00**	15A140X **130.00**	15A145X **145.00**	20	12605	3	185
25A140 **260.00**	25A145 **285.00**	25A140X **260.00**	25A145X **285.00**	40	25210	4	325
50A140 **460.00**	50A145 **500.00**	50A140X **460.00**	50A145X **500 00**	70	44117	5	350
100A140 **825.00**	100A145 **925.00**	100A140X **825.00**	100A145X **925.00**	125	78781	7	1135

Gear Tooth Cut-Off Coupling

A cut-off coupling is particularly desirable for direct connecting a power producing unit to the driven machine or when it is required to disconnect any portion of a line of shafting. The clutch is furnished with a pilot bearing which not only assists proper alignment of the two connecting shafts during installation but also maintains this alignment during the time of engagement. The pilot bearing should not be called upon to carry any part of the shaft load during service.

Shaft sizes should be liberal and in addition there should be a shaft bearing as close as possible on each side of coupling.

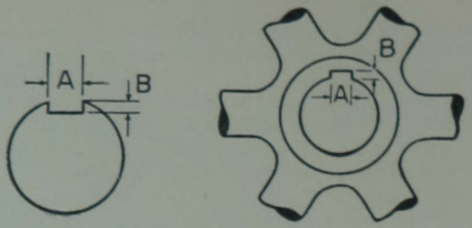
Single Plate

Bronze Pilot		Ball Brg. Pilot					
Bronze Slip Ring	Ball Bearing Slip Ring	Bronze Slip Ring	Ball Bearing Slip Ring	H.P. 100 R.P.M.	Torque Inch Pounds	Max. Bore In.	Wt. Lbs.
3A14020 **$50.00**	3A14520 **$55.00**	3A14019 **$60.00**	3A14519 **$65.00**	1½	945	1½	37
5A14020 **65.00**	5A14520 **70.00**	5A14019 **75.00**	5A14519 **80.00**	2½	1575	2	65
10A14020 **90.00**	10A14520 **100.00**	10A14019 **105.00**	10A14519 **115.00**	7½	4727	2½	120
15A14020 **150.00**	15A14520 **165.00**	15A14019 **170.00**	15A14519 **185.00**	20	12605	3	240
25A14020 **300.00**	25A14520 **325.00**	25A14019 **340.00**	25A14519 **365.00**	40	25210	4	460
50A14020 **535.00**	50A14520 **575.00**	50A14019 **590.00**	50A14519 **630.00**	70	44117	5	760
100A14020 **950.00**	100A14520 **1050.00**	100A14019 **1075.00**	100A14519 **1175.00**	125	78781	7	1600

Double Plate

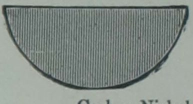
Bronze Pilot		Ball Brg. Pilot					
Bronze Slip Ring	Ball Bearing Slip Ring	Bronze Slip Ring	Ball Bearing Slip Ring	H.P. 100 R.P.M.	Torque Inch Pounds	Max. Bore In.	Wt. Lbs.
6B14020 **$65.00**	6B14520 **$70.00**	6B14019 **$75.00**	6B14519 **$80.00**	3	1890	1½	45
10B14020 **85.00**	10B14520 **90.00**	10B14019 **95.00**	10B14519 **100.00**	5	3150	2	80
20B14020 **120.00**	20B14520 **130.00**	20B14019 **135.00**	20B14519 **145.00**	15	9454	2½	140
30B14020 **195.00**	30B14520 **210.00**	30B14019 **215.00**	30B14519 **230.00**	40	25210	3	295
50B14020 **375.00**	50B14520 **400.00**	50B14019 **415.00**	50B14519 **440.00**	80	50420	4	555
100B14020 **660.00**	100B14520 **700.00**	100B14019 **715.00**	100B14519 **775.00**	140	88234	5	895
200B14020 **1150.00**	200B14520 **1250.00**	200B14019 **1275.00**	200B14519 **1375.00**	250	157562	7	1840

Standard Dimensions for Key-Seats



Standard depth of key-seat is used for all shafts and for pulleys, sheaves, gears and sprockets fitted to shafts.

Diameter Shaft Inches	Key-Seat Dimensions, Inches		
	Width A	Depth B	
		Standard	Shallow
15/16 to 1 1/4	1/4	1/8	..
1 5/16 to 1 3/4	3/8	3/16	..
1 13/16 to 2 1/4	1/2	1/4	1/8
2 5/16 to 2 3/4	5/8	5/16	3/16
2 13/16 to 3 1/4	3/4	3/8	3/16
3 5/16 to 3 3/4	7/8	7/16	1/4
3 13/16 to 4 1/4	1	1/2	1/4
4 5/16 to 4 3/4	1 1/8	9/16	1/4
4 13/16 to 5 1/4	1 1/4	5/8	1/4
5 5/16 to 5 3/4	1 3/8	11/16	1/4
5 13/16 to 6 1/4	1 1/2	3/4	1/4
6 5/16 to 7 1/4	1 3/4	3/4	1/4
7 5/16 to 8 1/4	2	3/4	3/8
8 5/16 to 9 1/4	2 1/4	7/8	3/8
9 5/16 to 10 1/4	2 1/2	7/8	3/8
10 5/16 to 11 1/4	2 3/4	7/8	3/8
11 5/16 to 12 1/4	3	7/8	3/8
12 5/16 to 13 1/4	3 1/4	1	3/8
13 5/16 to 14 1/4	3 1/2	1	3/8
14 5/16 to 15 1/4	3 3/4	1	3/8

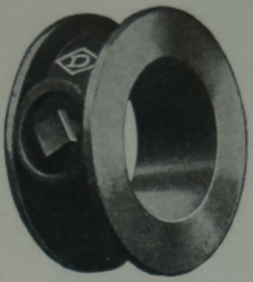


Woodruff Keys

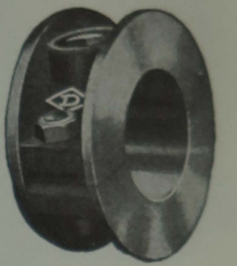
Nickel steel keys heat treated unless otherwise specified. Order by number.

No.	Carbon S.A.E. 1035 Per 100	Nickel S.A.E. 2330 Per 100	Size Inches	No.	Carbon S.A.E. 1035 Per 100	Nickel S.A.E. 2330 Per 100	Size Inches
201	$ .70	$ .75	1/4x1/16	21	$2.05	$2.90	1 1/4x1/4
206	.70	.75	5/16x1/16	D	2.45	3.55	1 1/4x5/16
207	.75	.80	5/16x3/32	E	2.85	4.20	1 1/4x3/8
211	.70	.75	3/8x1/16	22	2.45	3.50	1 3/8x1/4
212	.75	.85	3/8x3/32	23	2.85	4.15	1 3/8x5/16
213	.80	.90	3/8x1/8	F	3.20	4.75	1 3/8x3/8
1	.17	.21	1/2x1/16	24	2.80	4.00	1 1/2x1/4
2	.20	.26	1/2x3/32	25	3.45	4.95	1 1/2x5/16
3	.23	.33	1/2x1/8	G	4.00	5.80	1 1/2x3/8
4	.26	.34	5/8x3/32	126	1.60	1.95	2 1/8x3/16
5	.33	.44	5/8x1/8	127	2.00	2.45	2 1/8x1/4
6	.42	.54	5/8x5/32	128	2.35	2.90	2 1/8x5/16
61	.50	.65	5/8x3/16	129	2.75	3.40	2 1/8x3/8
7	.40	.54	3/4x1/8	26	2.25	3.15	2 1/8x3/16
8	.49	.64	3/4x5/32	27	2.95	4.10	2 1/8x1/4
9	.56	.78	3/4x3/16	28	3.65	5.10	2 1/8x5/16
91	.75	1.04	3/4x1/4	29	4.20	5.95	2 1/8x3/8
10	.70	.96	7/8x5/32	Rx	4.20	5.75	2 3/4x1/4
11	.80	1.12	7/8x3/16	Sx	4.80	6.70	2 3/4x5/16
12	.90	1.30	7/8x7/32	Tx	5.40	7.70	2 3/4x3/8
A	1.02	1.45	7/8x1/4	Ux	6.00	8.70	2 3/4x7/16
13	1.00	1.45	1 x3/16	Vx	6.60	9.65	2 3/4x1/2
14	1.18	1.70	1 x7/32	R	5.15	7.25	2 3/4x1/4
15	1.30	1.90	1 x1/4	S	6.05	8.70	2 3/4x5/16
B	1.55	2.30	1 x5/16	T	6.95	10.10	2 3/4x3/8
152	1.80	....	1 x3/8	U	7.75	11.45	2 3/4x7/16
141	1.15	....	1 x1/4	V	8.40	12.65	2 3/4x1/2
16	1.25	1.80	1 1/8x3/16	30	10.15	.....	3 1/2x3/8
17	1.45	2.05	1 1/8x7/32	31	11.40	.....	3 1/2x7/16
18	1.70	2.35	1 1/8x1/4	32	12.35	.....	3 1/2x1/2
C	2.05	2.80	1 1/8x5/16	33	13.70	.....	3 1/2x9/16
161	2.20	....	1 1/8x5/16	34	14.70	.....	3 1/2x5/8
19	1.60	2.25	1 1/4x3/16	35	16.20	.....	3 1/2x11/16
20	1.85	2.65	1 1/4x7/32	36	17.40	.....	3 1/2x3/4

Dodge Safety Collars



Solid

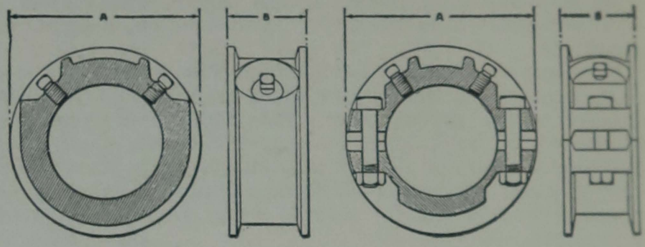


Split

These collars are made solid and split for all sizes of shafting and comply with all the legal requirements as to safety by having set screws and bolts protected.

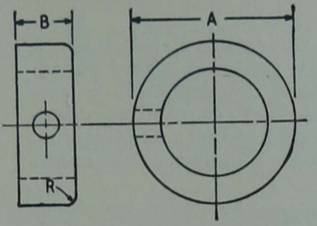
Finished and polished on periphery and faced on ends.

3 3/16 inch shaft size takes 2 square head set-screws. Smaller sizes take 1 square head set-screw.



Shaft Size In.	Solid Collars Dimen., In. A	Solid Collars Dimen., In. B	Solid Collars Price Each	Split Collars Dimen., In. A	Split Collars Dimen., In. B	Split Collars Price Each
15/16	2 7/16	1 3/8	$.65	3 1/8	1 3/8	$.95
1 3/16	2 7/16	1 3/8	.80	3 1/8	1 3/8	1.20
1 7/16	3	1 5/8	1.00	3 3/8	1 5/8	1.50
1 11/16	3 3/16	1 5/8	1.20	3 5/8	1 5/8	1.80
1 15/16	3 7/16	1 5/8	1.40	3 7/8	1 5/8	2.10
2 3/16	4 1/16	1 7/8	1.60	4 11/16	1 7/8	2.40
2 7/16	4 5/16	1 7/8	1.80	4 15/16	1 7/8	2.70
2 11/16	4 9/16	1 7/8	2.10	5 3/16	1 7/8	3.15
2 15/16	4 15/16	1 7/8	2.40	5 7/16	1 7/8	3.60
3 3/16	5 3/16	2	2.70	5 11/16	2	4.05
3 7/16	5 7/16	2	3.00	5 15/16	2	4.50
3 11/16	5 15/16	2 1/4	3.30	6 5/8	2 1/4	4.95
3 15/16	6 3/16	2 1/4	3.60	7	2 1/4	5.40
4 3/16	7 3/8	3 1/4	4.15	7 3/4	3 1/4	6.25
4 7/16	7 5/8	3 1/4	4.70	8	3 1/4	7.05
4 11/16	7 7/8	3 1/4	5.30	8 1/4	3 1/4	7.95
4 15/16	8 1/8	3 1/4	5.90	8 1/2	3 1/4	8.85
5 3/16	8 5/8	3 1/4	6.55	9	3 1/4	9.80
5 7/16	8 5/8	3 1/4	7.20	9	3 1/4	10.80
5 11/16	9 1/8	3 1/4	7.90	9 1/2	3 1/4	11.85
5 15/16	9 1/8	3 1/4	8.60	9 1/2	3 1/4	12.90
6 3/16	10 3/8	3 1/2	9.35	10 1/2	3 1/2	14.05
6 7/16	10 3/8	3 1/2	10.10	10 1/2	3 1/2	15.15
6 11/16	10 7/8	3 1/2	10.90	11	3 1/2	16.35
6 15/16	10 7/8	3 1/2	11.70	11	3 1/2	17.55
7 1/2	11 3/8	3 1/2	14.05	11 5/8	3 1/2	21.10
8	11 7/8	3 1/2	16.20	12	3 1/2	24.25
8 1/2	13	3 3/4	18.45	13	3 3/4	27.65
9	13 1/2	3 3/4	20.70	13 1/2	3 3/4	31.05
9 1/2	14	3 3/4	23.10	14	3 3/4	34.70
10	14 1/2	3 3/4	25.70	14 1/2	3 3/4	38.65

Dodge Solid Steel Collars



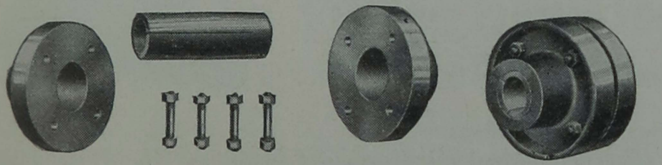
Made from solid bar stock, finished all over and polished. Hollow head set screws are regularly furnished and have a length equal to wall thickness, affording advantage of full thread strength, preventing stripping. Wrenches are extra and are not furnished unless ordered.

Collars will be furnished with slotted head set screws if so ordered at list prices shown.

Shaft Inches	Each	Wt., Lbs. per 100	Dimensions, Inches A	B	R	Set Screw
3/4	**$.50**	17	1 3/8	9/16	1/16	5/16x5/16
7/8	**.60**	19	1 1/2	9/16	1/16	5/16x5/16
15/16	**.62**	22	1 5/8	9/16	1/16	5/16x5/16
1	**.65**	21	1 5/8	9/16	1/16	5/16x5/16
1 1/16	**.70**	25	1 3/4	9/16	1/16	5/16x5/16
1 1/8	**.75**	23	1 3/4	9/16	1/16	5/16x5/16
1 3/16	**.80**	43	2	3/4	3/32	3/8x3/8
1 1/4	**.85**	41	2	3/4	3/32	3/8x3/8
1 5/16	**.90**	47	2 1/8	3/4	3/32	3/8x3/8
1 3/8	**.95**	44	2 1/8	3/4	3/32	3/8x3/8
1 7/16	**1.00**	50	2 1/4	3/4	3/32	3/8x3/8
1 1/2	**1.05**	47	2 1/4	3/4	3/32	3/8x3/8
1 5/8	**1.15**	60	2 1/2	3/4	3/32	3/8x3/8
1 11/16	**1.20**	57	2 1/2	3/4	3/32	3/8x3/8
1 3/4	**1.25**	81	2 3/4	7/8	1/8	3/8x3/8
1 7/8	**1.35**	78	2 3/4	7/8	1/8	3/8x3/8
1 15/16	**1.40**	102	3	7/8	1/8	1/2x1/2
2	**1.45**	97	3	7/8	1/8	1/2x1/2
2 3/16	**1.60**	112	3 1/4	7/8	1/8	1/2x1/2
2 1/4	**1.65**	106	3 1/4	7/8	1/8	1/2x1/2
2 7/16	**1.80**	140	3 1/2	1	5/32	1/2x1/2
2 1/2	**1.88**	132	3 1/2	1	5/32	1/2x1/2

Dodge-Shaw Single Compression Couplings

Improved



Style of Couplings for Sizes 3 Inches and Smaller

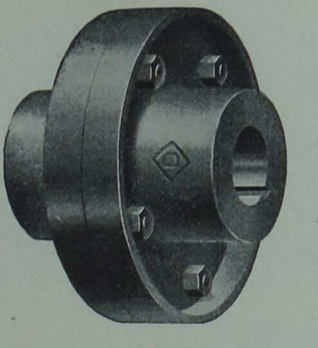
The design of this coupling has been improved in several important particulars. It is heavier than the original coupling, has greater holding power which is a decided advantage, and the necessity for using special wrenches for mounting has been eliminated.

This coupling holds the shafts firmly by compression caused by drawing tapered flanges together on tapered cast iron slotted sleeves, by means of draw bolts. No keyseats, set screws, facing or fitting is required.

Shaft Size Inches	Outside Diameter Inches	Overall Length Coupling Inches	Weight Pounds	Price Each
15/16, 7/8, 1	5	3	6	**$4.25**
1 3/16, 1 1/16, 1 1/8, 1 1/4	5 1/2	3 3/4	9	**4.75**
1 7/16, 1 5/16, 1 3/8, 1 1/2	6	4 1/2	12	**5.50**
1 11/16, 1 9/16, 1 5/8, 1 3/4	6 1/2	5 1/4	17	**6.25**
1 15/16, 1 13/16, 1 7/8, 2	7 1/4	6	25	**8.00**
2 3/16, 2 1/16, 2 1/8, 2 1/4	8 1/4	6 3/4	35	**9.00**
2 7/16, 2 5/16, 2 3/8, 2 1/2	9	7 1/2	45	**10.75**
2 11/16, 2 9/16, 2 5/8, 2 3/4	9 1/2	8 1/4	55	**13.00**
2 15/16, 2 13/16, 2 7/8, 3	10 1/4	9	70	**16.00**

Reducing couplings will take the cost of the larger shaft size plus 20 per cent. This applies when the sleeve is bored to fit the two shafts. If thimbles are used for reduction the cost will then be that of a straight bored coupling for the larger shaft size plus the cost of the thimble.

Dodge Cast Iron Flange Couplings



These couplings are machine finished all over, the bolt holes are reamed and fitted with turned steel coupling bolts, and ends of all bolts are properly protected so that the couplings comply with the legal requirements of all states as to safety.

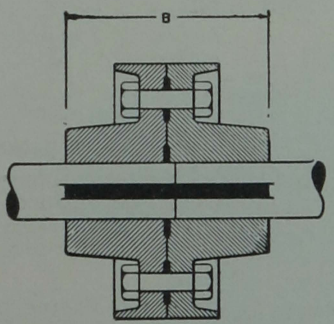
Size Shaft Inches	For Couplings and Keys not Fitted Each	For Keyseating Shafting Fitting and Facing Coupling on Same Each	Complete Fitted to Shaft Each	Size Shaft In.	For Couplings and Keys not Fitted Each	For Keyseating Shafting Fitting and Facing Coupling on Same Each	Complete Fitted to Shaft Each
1 3/16	**$7.50**	**$3.75**	**$11.25**	**4 15/16**	**$54.75**	**$11.50**	**$66.25**
1 7/16	**8.00**	**4.00**	**12.00**	**5 7/16**	**67.00**	**13.00**	**80.00**
1 11/16	**8.50**	**4.25**	**12.75**	**5 15/16**	**81.00**	**14.50**	**95.50**
1 15/16	**9.00**	**4.50**	**13.50**	**6 1/2**	**95.50**	**16.50**	**112.00**
2 3/16	**10.50**	**4.75**	**15.25**	**7**	**110.00**	**18.50**	**128.50**
2 7/16	**12.50**	**5.25**	**17.75**	**7 1/2**	**126.00**	**21.00**	**147.00**
2 11/16	**15.25**	**5.75**	**21.00**	**8**	**142.00**	**24.00**	**166.00**
2 15/16	**18.25**	**6.25**	**24.50**	**8 1/2**	**160.00**	**27.00**	**187.00**
3 3/16	**21.75**	**7.00**	**28.75**	**9**	**179.00**	**30.00**	**209.00**
3 7/16	**25.25**	**7.75**	**33.00**	**9 1/2**	**199.00**	**34.00**	**233.00**
3 11/16	**29.25**	**8.50**	**37.75**	**10**	**220.00**	**38.00**	**258.00**
3 15/16	**33.25**	**9.50**	**42.75**	**10 1/2**	**243.00**	**42.00**	**285.00**
4 3/16	**38.25**	**10.00**	**48.25**	**11**	**270.00**	**46.00**	**316.00**
4 7/16	**43.25**	**10.50**	**53.75**	**11 1/2**	**305.00**	**50.00**	**355.00**
4 11/16	**49.00**	**11.00**	**60.00**	**12**	**350.00**	**55.00**	**405.00**

Reducing couplings will be charged for at the rate of the larger size shaft of the pair, plus 20%.

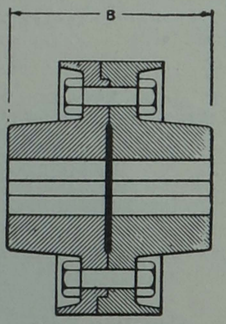
Male and female couplings will be charged for at above list prices, plus 20%. This extra applies to the charge for fitting as well as for couplings proper.

Dodge Flange Shaft Couplings

Dimensions



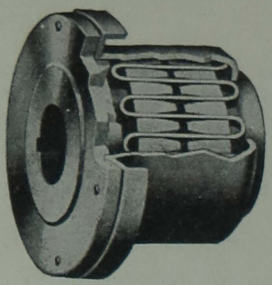
Plain



Male and Female

Size Shaft Inches	Outside Diameter Inches	Dimension B Inches	Size Shaft Inches	Outside Diameter Inches	Dimension B Inches
1 3/16	5 1/2	3 3/4	**4 15/16**	14 3/4	12 5/8
1 7/16	6	4 1/2	**5 7/16**	15 7/8	13 3/4
1 11/16	6 1/2	5 1/4	**5 15/16**	17	14 7/8
1 15/16	7 1/4	6	**6 1/2**	18 1/4	16
2 3/16	8 1/4	6 3/4	**7**	19 3/8	17 1/8
2 7/16	9	7 1/2	**7 1/2**	20 1/2	18 1/8
2 11/16	9 1/2	8 1/4	**8**	21 5/8	19 1/4
2 15/16	10 1/4	9	**8 1/2**	22 3/4	20 3/8
3 3/16	10 11/16	8 7/8	**9**	24	21 1/2
3 7/16	11 1/4	9 3/8	**9 1/2**	25 1/8	22 1/2
3 11/16	11 7/8	9 7/8	**10**	26 1/4	23 5/8
3 15/16	12 3/8	10 1/2	**10 1/2**	27 3/8	24 3/4
4 3/16	13	11	**11**	28 1/2	25 3/4
4 7/16	13 1/2	11 5/8	**11 1/2**	29 3/4	26 7/8
4 11/16	14 1/8	12 1/8	**12**	31	28

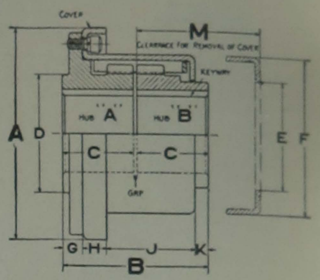
Falk Flexible Shaft Couplings



This coupling is of all steel construction, consisting of two hubs, a special tempered spring forming a cylindrical grid and a grid cover. The spring grid fits in specially formed slots in the hubs, which construction permits accommodation of angular and parallel misalignment, allows free end float, absorbs shocks and reduces oscillations. Couplings operate in either direction. They are efficiently lubricated and noiseless in operation.

Couplings are furnished for press fit unless otherwise specified. They are supplied with set screws over keyways only when specified.

Information regarding special couplings or standard couplings with taper bores or longer hub extensions given on request.



Size No.	Each	†Max Bore Inches	*Capacity H.P. at 100 R.P.M.	Wt., Lbs. with Max. Bore	Dimensions, Inches A	B	C	D	E	F	G	H	J	K	‡M	Min. Bore Inches	Lubricant Reqd. Lbs.
3C	$8.00	1 1/8	.4	4	3 3/4	2 3/8	1 1/8	1 3/4	1 25/32	2 9/16	1/4	15/32	1 3/8	9/32	2 5/8	1/2	1/8
4C	9.50	1 5/16	.9	5	4 1/16	2 7/8	1 3/8	1 15/16	2	2 7/8	9/32	15/32	1 7/8	1/4	3 3/8	3/4	1/8
5C	11.00	1 1/2	1.5	6	4 1/2	3 1/8	1 1/2	2 1/4	2 5/16	3 5/16	13/32	15/32	1 7/8	3/8	3 3/8	3/4	1/4
6C	14.00	1 13/16	2	9	5	3 5/8	1 3/4	2 7/8	2 15/16	3 13/16	21/32	15/32	1 7/8	5/8	3 3/8	1	3/8
7C	19.00	2 1/8	4	13	5 5/8	4 1/8	2	3 1/8	3 3/16	4 7/16	29/32	15/32	1 7/8	7/8	3 3/8	1	1/2
8C	27.00	2 1/2	8	22	7 1/8	4 5/8	2 1/4	3 13/16	3 7/8	5 1/4	9/16	1/2	2 15/16	5/8	4 7/8	1 1/4	5/8
9C	35.00	2 7/8	12	27	7 5/8	5 1/8	2 1/2	4 1/16	4 1/8	5 3/4	13/16	1/2	2 15/16	7/8	4 7/8	1 1/4	3/4
10C	45.00	3 1/4	16	35	8 1/4	5 11/16	2 3/4	4 3/4	4 13/16	6 3/8	3/4	1/2	3 11/16	3/4	6 1/8	1 1/2	1
11C	52.00	3 1/2	23	40	8 7/8	6 3/16	3	5 1/8	5 3/16	7	1	1/2	3 11/16	1	6 1/8	1 1/2	1 1/4
12C	65.00	3 7/8	35	55	9 3/4	6 15/16	3 3/8	5 11/16	5 3/4	7 13/16	1 3/8	5/8	3 21/32	1 9/32	6 1/8	2	1 1/2
13C	75.00	4 1/2	48	80	11	7 11/16	3 3/4	6 7/8	6 15/16	9 1/16	1 3/4	5/8	3 21/32	1 21/32	6 1/8	2	1 7/8
14C	90.00	4 7/8	70	100	12	8 1/2	4 1/8	7 1/4	7 5/16	9 13/16	1 43/64	5/8	4 21/32	1 35/64	7 3/4	2 1/2	2 1/8
15C	105.00	5 1/4	100	115	12 1/4	9 1/4	4 1/2	7 5/8	7 11/16	10 1/16	2 3/64	5/8	4 21/32	1 59/64	7 3/4	2 1/2	2 1/2
16C	130.00	6	140	160	13 7/8	10	4 7/8	9	9 1/16	11 5/8	2 27/64	5/8	4 11/16	2 17/64	7 3/4	3	3
17C	180.00	7	180	210	15 3/4	10 1/2	5 1/8	10 1/2	10 9/16	13 1/8	2 43/64	7/8	4 7/16	2 33/64	7 3/4	3	3 1/2
18C	250.00	8	230	280	17 1/4	11 1/4	5 1/2	12	12 1/16	14 5/8	3 3/64	7/8	4 7/16	2 57/64	7 3/4	4	4

Dimensions given are approximate. Dimension B is given for normal gap. Use certified print for exact dimensions.

*Maximum continuous rating for light, even loads. Selection of the proper size must be made not only by capacity rating but also with reference to table of service factors.

†Maximum bores as given are based on use of standard S.A.E. keys, which are recommended.

‡If there is not sufficient clearance for removal of cover on either shaft, special split shell type (Type CS) may be used. Prices and dimensions on application.

Permissible gaps are as follows: Minimum gap, all sizes, 1/16 inch. Normal gap, sizes 3C to 9C inclusive, 1/8 inch; 10C to 13C inclusive, 3/16 inch; 14C and above, 1/4 inch. Maximum gap, sizes 3C, 5/32 inch; 4C to 7C inclusive, 3/16 inch; 8C and 9C, 1/4 inch; 10C to 13C inclusive, 3/8 inch; 14C and above, 1/2 inch.

Standard Keys for Falk Couplings

Shaft Size ....inches	1/2 to 9/16	5/8 to 7/8	15/16 to 1 1/4	1 5/16 to 1 3/4	1 13/16 to 2 1/4	2 5/16 to 2 3/4
Key........ ....inches	1/8x1/8	3/16x3/16	1/4x1/4	3/8x3/8	1/2x1/2	5/8x5/8
Shaft Size ....inches	2 7/8 to 3 1/4	3 3/8 to 3 3/4	3 7/8 to 4 1/2	4 3/4 to 5 1/2	5 3/4 to 6 7/8	6 15/16 to 8
Key...............................inches	3/4x3/4	7/8x7/8	1x1	1 1/4x1 1/4	1 1/2x1 1/2	1 3/4x1 3/4

If larger keys are used, maximum bores must be reduced. Maximum bores may be increased slightly by use of smaller keys. Refer to manufacturer before ordering couplings with special keys.

How to Select Falk Flexible Couplings

The size of coupling required for any application depends, aside from the h.p. and speed of the driving unit, upon the nature of the load and the kind of drive used. Service factors for various loads with different drives will be found in table at bottom of this page.

$$\text{Coupling Rating} = \frac{\text{Horsepower} \times \text{Service Factor} \times 100}{\text{R.P.M.}}$$

This gives rating required in terms of h.p. per 100 r.p.m. Table above gives similar rating for each size coupling—see column 4. Select size with rating corresponding to or next greater than the rating required; never use coupling of lower rating. The service factors given in table for use in above equation are based on average good operating conditions and normal gap distance of coupling. Where alignment is poor and vibration or shock is excessive, use next larger size coupling than would otherwise be selected. Check maximum bore of size selected for shaft sizes to be used. If coupling selected will not bore to suit, use next larger size which meets bore requirements.

In requesting recommendations the following information should be furnished: Kind of driver (motor, gas engine, etc.); h.p. of driver (normal and maximum); r.p.m. of driver; kind of driven machine (duplex pump, mine hoist, etc.); diameter, projecting length and keyway of each shaft. State also any special or unusual operating conditions (fluctuating or reversing loads, severe shocks, etc.).

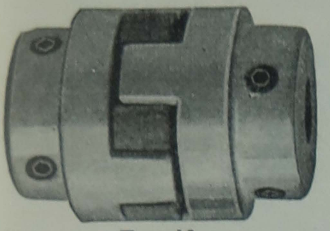
**Table of Minimum Service Factors

Machines	Type of Drive: Motor	Steam Engine	Oil or Gas Engine
Generators, Screens, Belt and Chain Conveyors, Evaporators, Centrifugal Water Pumps..............	1	2	4
Beaters, Line Shafts, Light Fan Drives, Light Blower Drives, Grain Pulverizers, Agitators, Machine Tools, Stokers..............	1 1/2	2 1/2	5
Duplex and Triplex Pumps, Mixers, Medium Fan Drives, Medium Blower Drives, Pulp Grinders, Vacuum Pumps, Motor Couplings for Steel Mills with Flywheels, Rubber Mixers..............	2	3	5 1/2
Ball Mills, Pebble Mills, Heavy Fan Drives, Heavy Blower Drives, Copper and Brass Rolling Mills, Presses, Cement Kilns, Dryers, Hoists, Crushers, Shredders, Light Hammer Mill Drives, Light Hog Drives, Welders..............	2 1/2	4	6
Rod Mills, Air and Gas Compressors, Suction Dredges, Heavy Hammer Mill Drives, Heavy Hog Drives, Low Speed Steel Mill Couplings, Jordans..............	3 1/2	5	7

Always secure recommendation before ordering coupling for this type of drive.

**These minimum service factors are based on average good alignment and absence of undue vibration. For unusual conditions and extra slow speeds, refer to manufacturer for recommendation.

L-R Flexible Couplings



Type IA

Dampens and absorbs shock, vibration, starting torque and intermittent overloads. Protects motor and driven machinery. Makes shaft alignment easy. Needs no lubrication at any time.

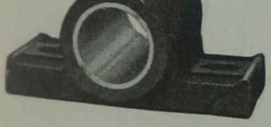
Type P couplings have individual load cushions.

Couplings can be supplied with removable jaw rings on one or both flanges for installations where connected machinery must be removed radially. Tapered or splined bores will be charged extra; an extra charge will also be made for keyseating.

Size No.	Each	Extra Spider Each	Max. Bore In.	Max. at 1750 R.P.M.	H. P. at 100 R.P.M.	Outside Diameter In.	Lgth. Overall In.	Approx. Weight Lbs.
IA-050	$2.00	$ .20	½	⅙	.....	1 3/32	1⅝	¼
IA-050X	2.25	.20	½	⅙	.....	1 3/32	2⅜	⅜
IA-050XX	2.50	.20	½	⅙	.....	1 3/32	3⅜	½
IA-070	3.00	.30	⅝	⅓	.....	1⅜	1 15/16	½
IA-085	4.00	.60	¾	1½	.....	1¾	2 1/16	1¼
IA-090	5.00	80	¾	2	.....	2⅛	2¼	1½
IA-095	6.00	.80	⅞	2½	.....	2⅛	2½	1¾
IA-100	10.00	1.50	1¼	7½	.....	2 9/16	3 3/16	2½
IA-150	18.00	3.00	1⅝	25	2.0	3¾	4¼	6
IA-190	20.00	6.00	2	40	3.0	4½	5¼	15
IA-225	30.00	6.00	2¼	...	5.0	5	6	21
IA-275	45.00	8.00	2¾	...	8.0	6¼	7⅝	40
P-300	72.00	*2.00	3	...	18.0	10½	6¾	100
P-350	85.00	*2.00	3½	...	30.0	11¾	8	130
P-400	100.00	*3.00	4	...	44.	13	9	170
P-450	130.00	*3.00	4½	...	68.	14	10	200
P-500	180.00	*3.00	5	...	90.	15	11	250
P-600	240.00	*3.00	6	...	150.	17½	13	400
P-700	300.00	*4.00	7	...	250.	20	15	600
P-800	440.00	*4.00	8	...	350.	24	18½	900

*Per cushion.

Dodge Solid Journal Bearings

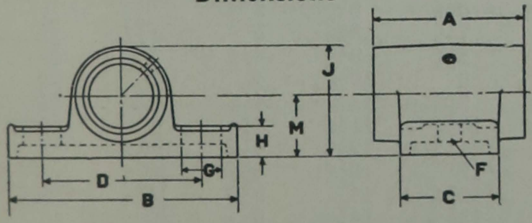


This babbitted bearing is intended for use where powers and speeds are moderate. A tapped hole is provided for standard grease cup.

Grease cup is not included.

Size Shaft, In.	Price Each	Size Shaft, In.	Price Each	Size Shaft, In.	Price Each	Size Shaft, In.	P ice Each
¾	$.95	1 11/16	$1.80	2 11/16	$3.60	3 15/16	$11.00
15/16	.95	1 15/16	2.10	2 15/16	4.80	4 7/16	20.00
1 3/16	1.20	2 3/16	2.70	3 3/16	5.90	...	.....
1 7/16	1.50	2 7/16	3.20	3 7/16	7.30	....	.....

Dimensions

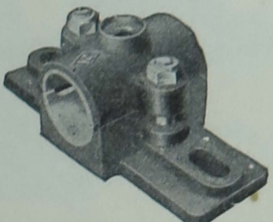


Size Shaft, In.	Dimensions, Inches A	B	C	D	F	G	H	J	M
¾	2⅝	4½	1¾	3	½	13/16	⅝	2 1/16	1
15/16	3	5	2	3⅜	½	⅞	11/16	2⅜	1⅛
1 3/16	3⅜	5½	2¼	3⅝	½	⅞	¾	2¾	1 5/16
1 7/16	3⅞	6	2½	4⅛	½	15/16	⅞	3⅛	1⅝
1 11/16	4¼	6½	2¾	4⅜	⅝	1	⅞	3⅜	1 13/16
1 15/16	4½	7	3	4¾	⅝	1 3/16	15/16	3½	1⅞
2 3/16	4⅝	7⅝	3¼	5¼	⅝	1⅛	1 1/16	4	2 5/16
2 7/16	5⅜	8	3½	5¾	⅝	1 3/16	1 1/16	4 5/16	2⅜
2 11/16	5¾	9⅜	3⅝	6½	¾	1 7/16	1⅛	4¾	2½
2 15/16	6⅛	10½	4	7⅜	¾	1¾	1 3/16	5	2 9/16
3 3/16	6⅝	11⅛	4⅜	7¾	⅞	1 11/16	1 3/16	5⅜	3
3 7/16	7	11¾	4¾	8¼	1	2	1⅜	5¾	3⅛
3 15/16	8	13	5½	9⅛	1	1⅞	1⅜	6¼	3 5/16
4 7/16	9	15⅜	6¼	10⅞	1¼	2⅝	1 9/16	7	3¾

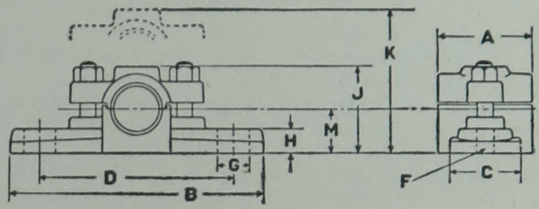
Dodge Common Flat Boxes

A good grade of babbitt is used, which is bored and reamed to shaft size. This bearing is extensively used where moderate powers are involved. Horizontal adjustment is secured by elongated bolt slots in base.

Size Shaft In.	Each	Size Shaft In.	Each
15/16	$1.00	2 11/16	$5.40
1 3/16	1.35	2 15/16	6.50
1 7/16	1.65	3 3/16	9.50
1 11/16	2.20	3 7/16	10.00
1 15/16	2.90	3 11/16	12.50
2 3/16	3.70	3 15/16	14.00
2 7/16	4.25	.....	.....



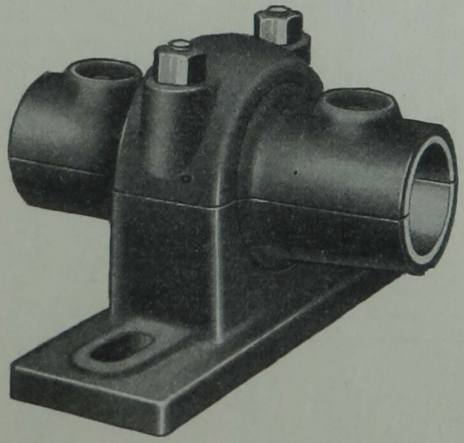
Dimensions



Size Shaft In.	Dimensions, Inches A	B	C	D	Bolt F	G	H	J	K	M
15/16	2	6½	1⅝	4¾	½	1	⅝	2⅛	3¼	1
1 3/16	2½	7¼	1⅞	5½	⅝	1	⅝	2⅜	3¾	1⅛
1 7/16	3	8	2¼	6⅛	⅝	1	¾	2¾	4¼	1⅜
1 11/16	3½	8⅝	2½	6½	⅝	1¼	¾	3⅛	4¾	1½
1 15/16	4	9⅜	2¾	7¼	⅝	1¼	⅞	3⅜	5	1⅝
2 3/16	4½	10	3	7⅝	¾	1⅜	⅞	3¾	5½	1⅞
2 7/16	5	10¾	3¼	8¼	¾	1½	1	4	5¾	2
2 11/16	5½	11½	3⅝	9	¾	1½	1	4⅜	6¼	2⅛
2 15/16	6	12⅛	3⅞	9⅝	¾	1½	1⅛	4¾	6½	2⅜
3 3/16	6½	12⅞	4⅛	9⅞	⅞	1¾	1⅛	5	7	2½
3 7/16	7	13⅝	4½	10⅝	⅞	1¾	1¼	5¼	7½	2⅝
3 11/16	7½	14¼	4¾	11⅛	⅞	2	1¼	5⅝	8	2⅞
3 15/16	8	15	5	11¾	⅞	2	1¼	6	8¼	3¼

Dodge Spherical Ball and Socket Pillow Blocks

Plain Babbitted

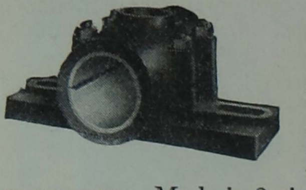


This pillow block is strong and well made, has the true-ball and socket feature, and steady pin in cap to prevent bearing from turning in housing. The bearing can be removed from shaft without disturbing alignment of same. It is babbitted, bored and faced on ends for collar.

Base plates to suit when ordered.

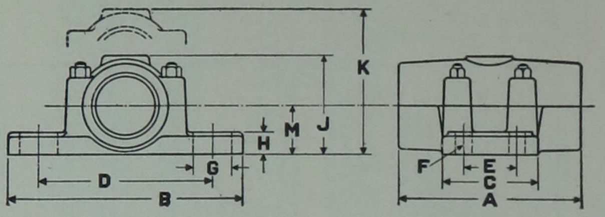
Size Shaft Inches	Price Each	Size Shaft Inches	Price Each	Size Shaft Inches	Price Each
1 3/16	$3.30	2 11/16	$11.50	4 7/16	$40.00
1 7/16	3.90	2 15/16	14.00	4 15/16	50.00
1 11/16	4.60	3 3/16	17.00	5 7/16	61.00
1 15/16	5.60	3 7/16	21.00	5 15/16	72.00
2 3/16	7.00	3 11/16	25.00	.....	.....
2 7/16	9.00	3 15/16	30.00	.....	.....

Dodge Plain Rigid Pillow Blocks



A heavy pillow block of plain oiling type, amply strong for any ordinary service. A good grade of babbitt is used which is bored and reamed to shaft size, and ends of bearings are faced off for collars. Caps are provided with oil pockets and tapped for grease cups. Made in 2 pieces, for general line and countershaft supports. Sizes 2 3/4 and larger have 4 bolts in caps. Sizes smaller than 2 3/4 have 2 bolts in caps.

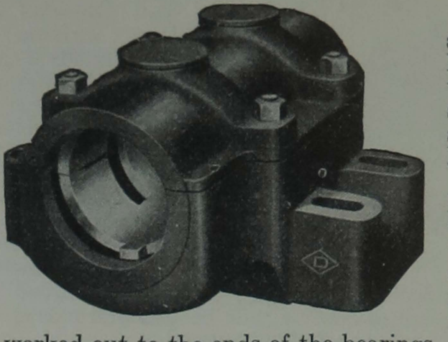
Dimensions



Size Shaft Inches	Dimensions, Inches A	B	C	D	2-Bolt F	4-Bolt E
1 5/16	3	6 1/2	2	4 3/4	1/2	...
1 3/16	3 3/4	7 3/4	2 1/4	5 5/8	5/8	...
1 7/16	4 1/2	8	2 5/8	5 7/8	5/8	1 1/2
1 11/16	5 1/4	8 1/2	3	6 3/8	5/8	1 3/4
1 15/16	6	10 1/4	3 3/8	7 11/16	3/4	1 3/4
2 3/16	6 3/4	10 3/8	3 3/4	7 7/8	3/4	2
2 7/16	7 1/2	10 3/4	4	8 1/4	3/4	2 1/4
2 11/16	8 1/4	11 1/2	4 3/8	8 5/8	3/4	2 1/2
2 15/16	9	12 1/8	4 3/4	9 1/8	3/4	2 1/2
3 3/16	9 3/4	12 7/8	5 1/8	9 5/8	7/8	3
3 7/16	10 1/2	13 1/2	5 1/2	10	7/8	3
3 11/16	11 1/4	14 1/4	5 3/4	10 3/4	7/8	3
3 15/16	12	15	6 1/8	11	7/8	3 1/2
4 3/16	13	16	6 1/2	11 1/4	1	3 1/2
4 7/16	13 1/2	16	6 3/4	12	1	3 3/4
4 15/16	15 1/4	17 1/4	7 1/4	12 1/2	1 1/8	3 3/4

Size Shaft Inches	Dimensions, Inches 4-Bolt F	G	H	J	K	M
1 5/16	...	1	5/8	2 1/16	3 1/8	1
1 3/16	...	1 1/4	3/4	2 9/16	3 15/16	1 1/4
1 7/16	1/2	1 1/4	13/16	2 15/16	4 1/2	1 7/16
1 11/16	1/2	1 1/4	7/8	3 5/16	5	1 5/8
1 15/16	5/8	1 1/2	7/8	3 11/16	5 1/2	1 11/16
2 3/16	5/8	1 1/2	1	4 1/8	6 1/4	2
2 7/16	5/8	1 1/2	1 1/16	4 3/8	6 5/8	2 1/8
2 11/16	5/8	1 3/4	1 1/8	4 3/4	6 7/8	2 5/16
2 15/16	5/8	2	1 3/16	5 1/8	7 3/8	2 1/2
3 3/16	3/4	2 1/8	1 1/4	5 1/2	8 1/4	2 11/16
3 7/16	3/4	2 1/4	1 5/16	5 7/8	8 3/4	2 7/8
3 11/16	3/4	2 3/8	1 3/8	6 3/16	9 1/8	3
3 15/16	7/8	2 1/2	1 7/16	6 9/16	9 5/8	3 3/16
4 3/16	7/8	3 1/4	1 1/4	7 1/2	9 7/8	3 3/8
4 7/16	1	2 3/4	1 1/2	7 5/16	10 5/16	3 5/8
4 15/16	1	3 1/4	1 1/2	8 1/8	11 1/2	3 3/4

Ring-Oiling Rigid Pillow Blocks

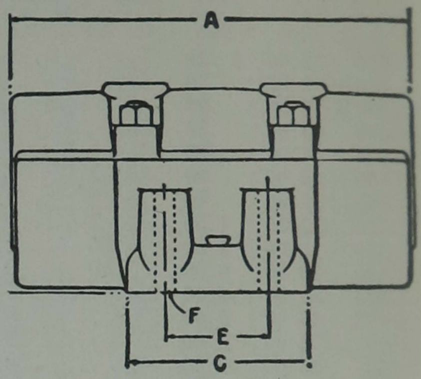


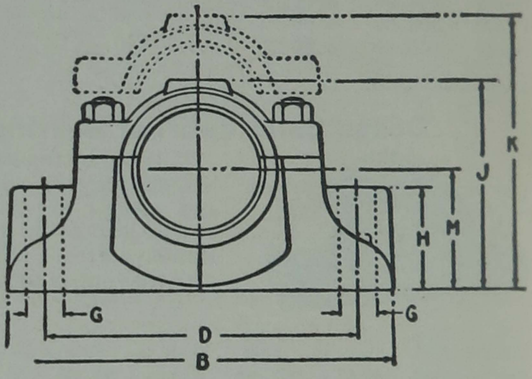
A heavy and substantial block with large bearing area which insures a reasonable pressure per square inch upon the liner.

The methods of lubrication are positive. The oil reservoirs are large, and effective shaft wipers return the oil to the reservoir when it has worked out to the ends of the bearings.

The babbitt used possesses that peculiar combination of requisite hardness to give good anti-friction qualities, and requisite plasticity to allow it to conform readily to the shaft without heating.

One filling of the reservoir will last for several months. The elimination of constant attendance in oiling the bearing saves a considerable labor charge and eliminates that risk of accident and injury to workmen which always exists when men work around a fast shaft.



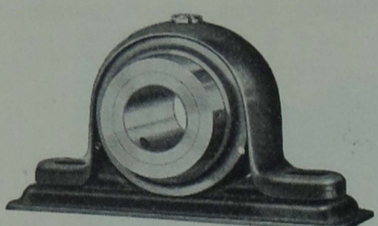


Shaft Sizes, In.	Dimensions, Inches—Bolts A	B	C	D	F	G
1 3/16	5	7	2 3/8	5 3/8	1/2	1
1 7/16	6	7 1/2	2 5/8	5 7/8	1/2	1
1 11/16	6 3/4	8	2 7/8	6 3/8	1/2	1
1 15/16	7 1/2	8 5/8	3	6 3/4	5/8	1 1/4
2 3/16	8 1/4	9 1/2	3 3/4	7 5/8	5/8	1 1/4
2 7/16	9	10 1/4	4	8	3/4	1 1/2
2 11/16	9 7/8	11	4 1/8	8 3/4	3/4	1 1/2
2 15/16	10 5/8	11 3/4	4 1/2	9 1/8	7/8	1 3/4
3 3/16	11 1/8	12 1/2	4 7/8	9 7/8	7/8	1 3/4
3 7/16	12	13 1/4	5 1/8	10 1/2	7/8	1 3/4
3 11/16	12 3/4	14	5 1/2	11 1/8	7/8	1 3/4
3 15/16	13 1/2	14 1/2	6	11 1/2	7/8	1 3/4

Shaft Sizes, In.	Dimensions, Inches H	J	K	M	Price Each
1 3/16	1 1/2	3 1/8	4 1/2	1 3/4	$4.50
1 7/16	1 5/8	3 5/8	5	2	5.00
1 11/16	1 5/8	3 7/8	5	2 1/8	5.70
1 15/16	1 5/8	4 1/8	5 3/8	2 1/4	6.80
2 3/16	1 7/8	4 5/8	6	2 1/2	8.20
2 7/16	2 1/8	5 1/4	6 3/4	2 3/4	9.80
2 11/16	2 3/8	5 1/2	7 1/8	3	12.00
2 15/16	2 1/2	5 3/4	7 5/8	3	14.00
3 3/16	2 3/4	6 3/8	8 1/4	3 1/4	18.00
3 7/16	3	6 5/8	8 5/8	3 1/2	22.00
3 11/16	3 1/8	7 1/8	9 1/8	3 3/4	27.00
3 15/16	3 1/4	7 5/8	9 5/8	4	32.00

Made in larger sizes up to 10 1/2 inches.

Type DH Dodge Ball Bearing Pillow Blocks



Designed to provide an anti-friction bearing with all of the essential characteristics demanded by designers of machinery at a price that would permit of its application to light duty machinery and other uses within the range of its load capacity.

The Type DH is fully self-aligning and incorporates the well-known high quality single row deep groove Hoover ball bearing. This bearing embodies every essential of correct design combined with high precision manufacture.

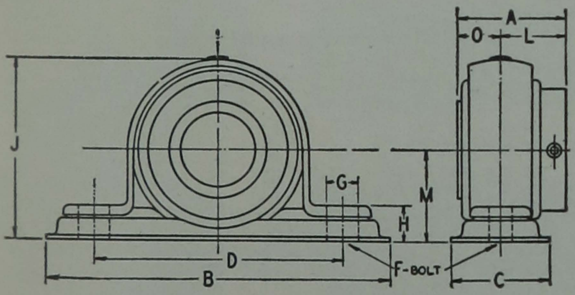
The housing is of heavy gauge steel formed to insure extreme rigidity and is of 2-piece construction.

This pillow block is of the expansion type and can be furnished also in non-expansion where required. The expansion feature is very important providing as it does for changes due to temperature or bearing position due to side warping or springing of machine frame.

This bearing is a completely assembled, factory adjusted unit and is hermetically sealed against loss of lubricant or admission of dirt.

Shaft Size Inches	Each	Wt. Lbs.	Shaft Size Inches	Each	Wt. Lbs.
11/16–3/4–1 3/16	$6.80	1 5/8	1 1/2–1 9/16–1 5/8	$9.85	5
15/16–7/8–1	7.25	1 7/8	1 11/16–1 3/4–1 13/16	10.60	5 3/4
1 3/16–1 1/16–1 1/8	8.10	2 5/8	1 15/16–1 7/8–2	12.40	6 5/8
1 7/16–1 1/4–1 5/16–1 3/8	8.95	4	2 3/16–2 1/4–2 1/16–2 1/8	14.75	8 1/8

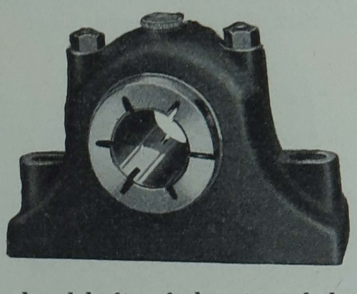
Dimensions



Shaft Size Inches	Dimensions, Inches A	B	C	D	F Bolt	G
11/16–3/4–1 3/16	1 11/16	5	1 1/2	3 1/2	3/8	9/16
15/16–7/8–1	1 7/8	5 3/8	1 5/8	3 3/4	3/8	9/16
1 3/16–1 1/16–1 1/8	2	6	1 7/8	4 1/8	3/8	9/16
1 7/16–1 1/4–1 5/16–1 3/8	2 5/16	7	2 1/8	4 7/8	1/2	3/4
1 1/2–1 9/16–1 5/8	2 5/16	7 1/2	2 3/16	5 1/2	1/2	3/4
1 11/16–1 3/4–1 13/16	2 15/32	8	2 1/4	5 3/4	5/8	15/16
1 15/16–1 7/8–2	2 19/32	8 1/2	2 3/8	6	5/8	15/16
2 3/16–2 1/4–2 1/16–2 1/8	2 5/8	9	2 1/2	6 1/2	5/8	15/16

Shaft Size Inches	Dimensions, Inches H	J	L	O	M
11/16–3/4–1 3/16	1/2	2 5/8	1	11/16	1 5/16
15/16–7/8–1	9/16	2 3/4	1 3/32	25/32	1 7/16
1 3/16–1 1/16–1 1/8	5/8	3 1/4	1 5/32	27/32	1 5/8
1 7/16–1 1/4–1 5/16–1 3/8	3/4	3 3/4	1 3/8	15/16	1 7/8
1 1/2–1 9/16–1 5/8	3/4	4 1/8	1 3/8	15/16	2 1/16
1 11/16–1 3/4–1 13/16	13/16	4 1/4	1 1/2	31/32	2 1/8
1 15/16–1 7/8–2	7/8	4 1/2	1 19/32	1	2 1/4
2 3/16–2 1/4–2 1/16–2 1/8	7/8	4 7/8	1 19/32	1 1/32	2 1/2

Dodge-Timken Ball and Socket Pillow Blocks



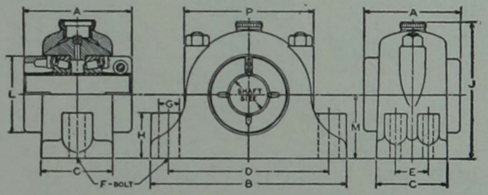
Adapted for headshafts of elevators, belt conveyors and many machine applications.

Block is self-aligning and where only 2 bearings are used on the shaft they need be only approximately in line. When 3 or more are used on a shaft careful attention should be given to alignment in order to properly distribute load to several bearings. For this purpose adjustable base plates will be found advantageous and with the larger sizes on account of the rigidity of the shaft and the large loads carried practically necessary.

In the case of short 2-bearing shafts at moderate speeds no attention need be given to the lineal expansion or contraction of the shaft. In other cases use one of these bearings as an anchor bearing to hold shaft in position endwise and for other bearings use S-1 pillow block.

Inner races of roller bearings are tightly fitted to a special alloy steel sleeve. Sleeve is provided with slots at each end so that ends of sleeve will be slightly contractible in order that it can be firmly clamped to shaft and also take care of slight variations in diameter found in commercial shafting. To do this there is fitted to each end of the sleeve a split malleable iron clamp collar fitted with a hardened steel clamp screw.

Suitable grease enclosures are used and bearings are properly lubricated when assembled. Re-lubrication is only required at infrequent intervals.



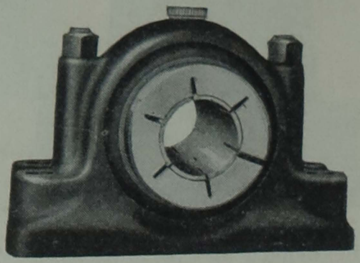
Size Shaft In.	Shaft Sizes Included In.	Each	Dimensions, Inches A	B	C	D	2-Bolt F
1 7/16	1 3/16–1 7/16	$19.00	4 1/2	9	3	7 1/4	1/2
1 11/16	1 1/2–1 3/4	20.50	4 7/8	9 1/2	3 3/8	7 3/4	1/2
1 15/16	1 13/16–1 15/16	23.50	5 1/4	11	3 1/2	8 3/4	5/8
2 3/16	2 –2 1/4	27.50	5 3/4	12	4	9 3/4	5/8
*2 7/16	2 5/16–2 7/16	35.00	6	13 1/4	4 1/4	10 3/4	3/4
*2 15/16	2 1/2–2 15/16	45.00	6 1/2	14 1/4	4 3/4	11 3/4	3/4
*3 7/16	3 –3 7/16	60.00	7	16 3/4	5 1/2	13 3/4	7/8
3 15/16	3 1/2–4	100.00	9 1/2	19	7	15 1/2	..
4 7/16	4 1/16–4 1/2	150.00	10	20	7 1/2	16 1/2	..
4 15/16	4 9/16–5	210.00	11 1/4	23	8 1/4	18 3/4	..

Size Shaft In.	Dimensions, Inches 4-Bolt E	4-Bolt F	G	H	J	L	M	P	Weight Pounds
1 7/16	...	...	1	2 1/8	6 1/4	3 1/8	2 7/8	5 3/8	24
1 11/16	...	...	1	2 3/8	6 13/16	3 1/2	3 1/8	5 7/8	30
1 15/16	...	...	1 1/4	2 1/2	7 1/8	3 7/8	3 1/4	6 1/2	38
2 3/16	...	...	1 1/4	2 7/8	8	4 3/8	3 3/4	7 1/4	52
*2 7/16	2 1/2	5/8	1 1/2	3	8 9/16	4 5/8	4	7 7/8	64
*2 15/16	2 3/4	5/8	1 1/2	3 3/4	9 7/8	5 7/16	4 3/4	9	92
*3 7/16	3 1/4	3/4	1 3/4	4	11 3/8	5 15/16	5 1/2	10 3/8	130
3 15/16	3 1/4	7/8	1 1/2	4	13 3/8	7 7/16	6 3/8	12 3/4	215
4 7/16	3 1/2	7/8	1 7/8	4	14 1/2	8 7/16	7 1/4	13 1/4	270
4 15/16	3 3/4	1	2 1/8	4 1/4	15 5/8	9 3/8	7 1/2	15	370

*2-bolt base regularly furnished 2 7/16 to 3 7/16-inch inclusive; can be furnished 4-bolt base when specified.

Dodge-Timken S-1 Pillow Blocks

Self-Aligning, Expansion
Slotted Clamp Sleeve Type



This style pillow block is of lighter design than the regular ball and socket style but suitable for many services, particularly machine applications.

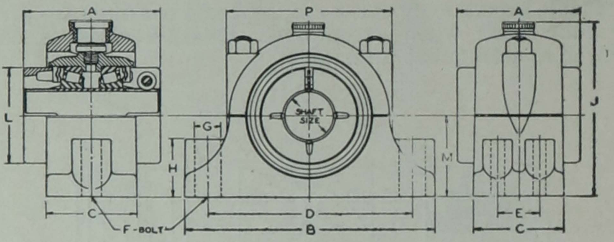
The outside of the inner housing is made spherical at the center of its length.

This fits inside outer housing which has a cylindrical bore. This permits the inner housing to be self-aligning while axial movement to take care of expansion is possible.

Cap is separated from base by shims.

When it is desired to have one of the bearings act as an anchor or non-expansion bearing the shims are reduced in thickness and after shaft has come to position, cap of outer housing is clamped down tightly so as to lock inner housing firmly against axial movement.

When end thrust of shaft is considerable or where shaft is subject to considerable shock or vibration it will be advantageous to use one of the regular ball and socket bearings for the anchor bearing. The same instructions as to use of base plates for shafts with more than 2 bearings apply as when regular ball and socket pillow blocks are used.



Shaft Size Inches	Each	Shaft Sizes Included Inches	Dimensions, Inches A	B	C	D	2-Bolt F	4-Bolt E
1 7/16	$19.00	1 3/16 – 1 7/16	4 1/2	9	3	7 1/4	1/2	...
1 11/16	20.50	1 1/2 – 1 3/4	4 7/8	9 1/2	3 3/8	7 3/4	1/2	...
1 15/16	23.50	1 13/16 – 1 15/16	5 1/4	11	3 1/2	8 3/4	5/8	...
2 3/16	27.50	2 – 2 1/4	5 3/4	12	4	9 3/4	5/8	...
*2 7/16	35.00	2 5/16 – 2 7/16	6	13 1/4	4 1/4	10 3/4	3/4	2 1/2
*2 15/16	45.00	2 1/2 – 2 15/16	6 1/2	14 1/4	4 3/4	11 3/4	3/4	2 3/4
*3 7/16	60.00	3 – 3 7/16	7	16 3/4	5 1/2	13 3/4	7/8	3 1/4
3 15/16	100.00	3 1/2 – 4	9 1/2	19	7	15 1/2	..	3 1/4
4 7/16	150.00	4 1/16 – 4 1/2	10	20	7 1/2	16 1/2	.	3 1/2
4 15/16	210.00	4 9/16 – 5	11 1/4	23	8 1/4	18 3/4	..	3 3/4

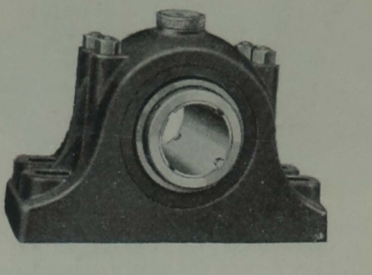
Shaft Size Inches	Dimensions, Inches 4-Bolt F	G	H	J	L	M	P	Shlp. Wt. Lbs.
1 7/16	...	1	2 1/8	6 1/16	3 1/8	2 7/8	5 7/8	24
1 11/16	...	1	2 3/8	6 5/8	3 1/2	3 1/8	6 1/2	30
1 15/16	...	1 1/4	2 1/2	7	3 7/8	3 1/4	7 3/8	38
2 3/16	...	1 1/4	2 7/8	7 7/8	4 3/8	3 3/4	8	52
*2 7/16	5/8	1 1/2	3	8 7/16	4 5/8	4	8 7/8	64
*2 15/16	5/8	1 1/2	3 3/4	9 11/16	5 7/16	4 3/4	9 7/8	92
*3 7/16	3/4	1 3/4	4	11 1/8	5 15/16	5 1/2	11 5/8	130
3 15/16	7/8	1 3/4	4	12 15/16	7 7/16	6 3/8	13 7/8	215
4 7/16	7/8	1 3/4	4	14 1/2	8 7/16	7 1/4	15 1/4	270
4 15/16	1	2 1/8	4 1/4	15 3/16	9 3/8	7 1/2	16 3/4	370

*Sizes 2 7/16 to 3 7/16 inches inclusive can be furnished with 4-bolt base when specified.

The dimensions given above are subject to change or correction.

Dodge-Timken Special Duty Ball and Socket Pillow Blocks

Adapter Type—Non-Expansion

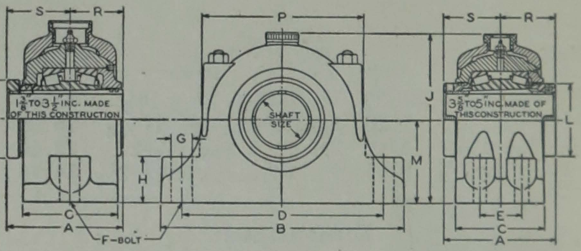


This pillow block consists of a Dodge-Timken Special Duty D Unit (Adapter type) mounted in a 2-piece cast iron outer housing with 2 generously proportioned machined spherical surfaces on the inside which are widely spaced and form a deep, accurately formed socket for the ball portion of the inner unit.

The cap and base are milled at the joint to provide accurate joining of the 2 parts by heavy machine bolts. Suitable for heavy service and high speeds.

The base of the outer housing is milled to insure accurate backing, i.e., the distance from the pillow block base to center of shaft, and is provided with slotted holes for foundation bolts. Sizes 1 3/8 to 3 1/2 inches are regularly furnished with 2 bolts in base. Sizes 2 3/8 to 3 1/2 inches inclusive can be furnished with 4 bolts in base upon special order. Size 3 5/8 inches and up have 4 bolts in base. The base is also furnished with dowel pin bosses cast in place so dowel pin holes can be drilled by customer.

Wedge adjusting base plates can be furnished for all sizes of pillow blocks.


S
R
P
S
R
1 7/8" TO 3 1/2" INC. MADE OF THIS CONSTRUCTION
3 5/8" TO 5" INC. MADE OF THIS CONSTRUCTION
SHAFT SIZE
J
L
L
G
H
M
C
A
F-BOLT
D
B
E
C
A

Dimensions and Prices

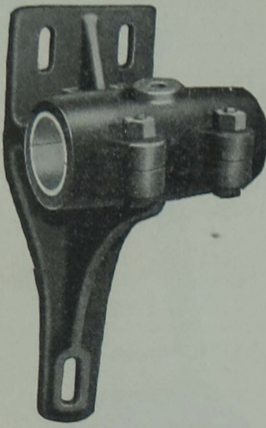
Size Shaft In.	Each	Shaft Sizes Included In.	Dimensions, Inches A	B	C	D	2-Bolt Base F	4-Bolt Base E	F
1 7/16	$19.00	1 3/8 – 1 1/2	4	9	3	7 1/4	1/2	...	...
1 11/16	20.50	1 5/8 – 1 3/4	4 1/8	9 1/2	3 3/8	7 3/4	1/2	...	...
1 15/16	23.50	1 7/8 – 2	4 1/4	11	3 1/2	8 3/4	5/8	...	...
2 3/16	27.50	2 1/8 – 2 1/4	4 9/16	12	4	9 3/4	5/8	...	...
2 7/16	35.00	2 3/8 – 2 1/2	5 1/16	13 1/4	4 1/4	10 3/4	3/4	*2 1/2	5/8
2 11/16	45.00	2 5/8 – 2 3/4	5 3/4	14 1/4	4 3/4	11 3/4	3/4	*2 3/4	5/8
2 15/16	45.00	2 7/8 – 3	5 3/4	14 1/4	4 3/4	11 3/4	3/4	*2 3/4	5/8
3 7/16	60.00	3 3/16 – 3 1/2	6 3/8	16 3/4	5 1/2	13 3/4	7/8	*3 1/4	3/4
3 15/16	125.00	3 11/16 – 4	8 1/2	19	7	15 1/2	..	3 1/4	7/8
4 7/16	175.00	4 3/16 – 4 1/2	9 1/2	20	7 1/2	16 1/2	..	3 1/2	7/8
4 15/16	250.00	4 11/16 – 5	10 1/2	23	8 1/4	18 3/4	..	3 3/4	1

Size Shaft In.	Dimensions, Inches G	H	J	L	M	P	R	S	Ship. Wt. Lbs.
1 7/16	1	2 1/8	6 1/4	2 7/16	2 7/8	5 3/8	1 13/16	2 3/16	24
1 11/16	1	2 3/8	6 13/16	2 13/16	3 1/8	5 7/8	1 7/8	2 1/4	30
1 15/16	1 1/4	2 1/2	7 1/8	3 1/16	3 1/4	6 1/2	1 15/16	2 5/16	38
2 3/16	1 1/4	2 7/8	8	3 7/16	3 3/4	7 1/4	2 1/16	2 1/2	52
2 7/16	1 1/2	3	8 9/16	3 13/16	4	7 7/8	2 5/16	2 3/4	64
2 11/16	1 1/2	3 3/4	9 7/8	4 7/16	4 3/4	9	2 5/8	3 1/8	92
2 15/16	1 1/2	3 3/4	9 7/8	4 7/16	4 3/4	9	2 5/8	3 1/8	92
3 7/16	1 3/4	4	11 3/8	5 1/16	5 1/2	10 3/8	2 15/16	3 7/16	130
3 15/16	1 1/2	4	13 3/8	5 11/16	6 3/8	12 3/4	4 1/4	4 1/4	215
4 7/16	1 7/8	4	14 1/2	6 7/16	7 1/4	13 1/4	4 3/4	4 3/4	270
4 15/16	2 1/8	4 1/4	15 5/8	6 15/16	7 1/2	15	5 1/4	5 1/4	370

*2-bolt base regularly furnished. Sizes 2 7/16 to 3 7/16 inches inclusive can be furnished with 4-bolt base upon special order.

Dodge Rigid Post Bearings

Plain Babbitted



Sizes 3-Inch and Under

This type of bearing is used where shafting is supported from posts or columns.

Ample vertical adjustment is secured by means of elongated slots in the back plate or base.

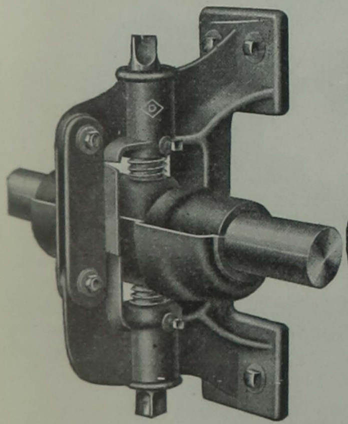
The bearings are babbitted with a good quality of babbitt metal which is bored to shaft size.

A standard dimension of 6 inches from post to shaft center is maintained in all sizes.

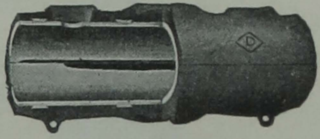
Size, Shaft Inches	Price Each	Size, Shaft Inches	Price Each
1 3/16	$3.25	2 15/16	$10.35
1 7/16	3.60	3 7/16	14.10
1 11/16	4.10	3 15/16	22.40
1 15/16	5.45	4 7/16	31.90
2 3/16	7.25	4 15/16	40.10
2 7/16	8.35	5 7/16	55.00
2 11/16	9.15	.....	.....

Dodge Adjustable Ball and Socket Post Hangers

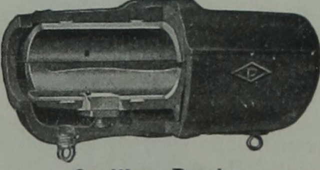
With Ring, Capillary and Plain Bearing



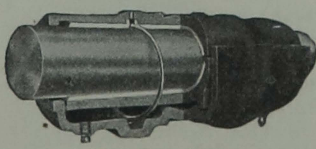
Hanger



Standard Bearing



Capillary Bearing



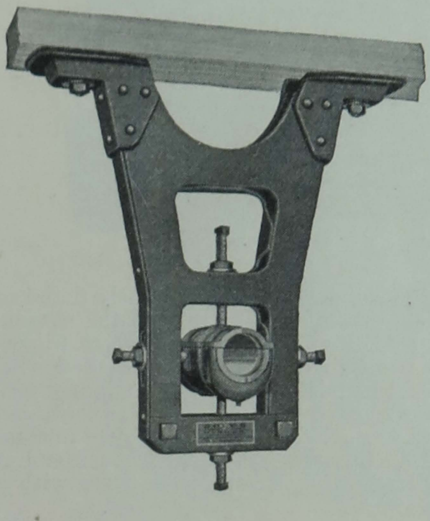
Ring Bearing

Size Shaft In.	Price, Each Type Bearing Plain Oiling	Capillary	Ring	Size Shaft In.	Price, Each Type Bearing Plain Oiling	Capillary	Ring
15/16	$4.40	$5.35	Not Made	3 3/16	$19.00	$27.70	$27.70
1 3/16	4.50	5.70	$5.70	3 7/16	19.45	30.15	30.15
1 7/16	5.50	6.50	6.50	3 11/16	25.45	34.60	34.60
1 11/16	5.60	6.75	6.75	3 15/16	28.70	36.40	36.40
1 15/16	7.15	9.30	9.30	....	.....	....	......
2 3/16	9.75	12.00	12.00	4 7/16	34.20	Not Made	43.05
2 7/16	10.40	12.65	12.65	....	.....	....	......
2 11/16	13.00	15.95	15.95	4 15/16	46.40	Not Made	59.75
2 15/16	14.95	18.70	18.70	....	.....	....	......

Dodge Pressed Steel Drop Hangers

With Ring or Capillary Oiling Bearings

U. S. Patent 1,472,236



A rugged, practical hanger for general power transmission service.

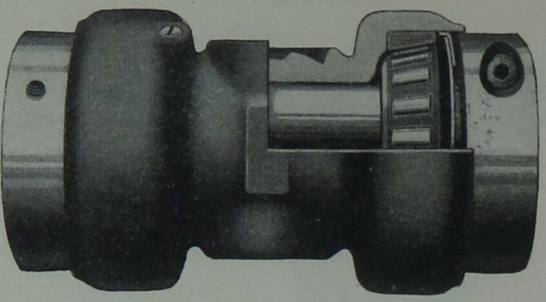
The box frame provides a section of the greatest possible strength and rigidity for its weight. The two halves are identical and after being welded together are further reinforced by riveting at all points of strain.

Broad malleable iron feet extend down the sides of the frame and securely fasten by large rivets. The head is securely bolted to the frame and cylindrical spacers around the bolts prevent distortion of frame when bolts are tightened. Four-point adjustment of bearing in frame is provided. The head is easily removable which facilitates insertion of shaft and bearings.

Frame Symbol	Shaft Size Inches	Drop to Center of Shaft Inches	Frames Only Each	Weight Pounds	*Dodge-Timken Roller Hanger Bearings Each	Complete with Oneida Type Ring or Capillary Oiling Bearings Each	Weight Pounds
1½	15/16	6– 8	$2.50	8	.....	$4.25	11
		10–12	3.00	9		4.75	12
		14–16	3.75	12		5.50	15
		18–20	4.50	13		6.25	16
1½	1 3/16	6– 8	2.50	8	$18.20	4.50	12
		10–12	3.00	9		5.00	13
		14–16	3.75	12		5.75	16
		18–20	4.50	13		6.50	17
1½	1 7/16	6– 8	2.50	8	15.50	5.00	13
		10–12	3.00	9		5.50	14
		14–16	3.75	12		6.25	17
		18–20	4.50	13		7.00	18
2	1 11/16	6– 8	3.25	12	16.50	6.00	20
		10–12	3.75	15		6.50	23
		14–16	4.50	17		7.25	25
		18–20	5.00	22		7.75	30
		22–24	5.75	25		8.50	33
2	1 15/16	6– 8	3.25	12	19.00	7.00	21
		10–12	3.75	15		7.50	24
		14–16	4.50	17		8.25	26
		18–20	5.00	22		8.75	31
		22–24	5.75	25		9.50	34
2½	2 3/16	10–12	5.25	21	22.50	9.50	34
		14–16	6.25	23		10.50	36
		18–20	7.00	28		11.25	41
		22–24	8.00	31		12.25	44
2½	2 7/16	10–12	5.25	21	27.50	10.50	37
		14–16	6.25	23		11.50	39
		18–20	7.00	28		12.25	44
		22–24	8.00	31		13.25	47
3	2 11/16	10–12	7.50	27	37.50	13.50	48
		14–16	9.00	29		15.00	50
		18–20	11.00	35		17.00	56
		22–24	12.50	40		18.50	61
3	2 15/16	10–12	7.50	27	37.50	15.50	49
		14–16	9.00	29		17.00	51
		18–20	11.00	35		19.00	57
		22–24	12.50	40		20.50	62

*To obtain prices of pressed steel drop hangers complete with Dodge-Timken Roller Hanger Bearings, combine net prices of frame with net prices of bearings.

Dodge-Timken Non-Expansion Hanger Bearings



The inner races of the roller bearings are tightly fitted to a special alloy steel sleeve which is ground on the outside and the inside. The inside diameter is large enough to permit sliding on a full sized shaft. Sleeve is provided with slots at each end so that ends of sleeve will be slightly contractible in order that it can be firmly clamped to shaft and also take care of slight variations in diameter found in commercial shafting. To do this there is fitted to each end of the sleeve a split malleable iron clamp collar fitted with a hardened steel clamp screw.

To secure hanger bearing to shaft clamp screws should be set up as tightly as possible so as to make shaft, the sleeve and inner races of bearings one integral structure.

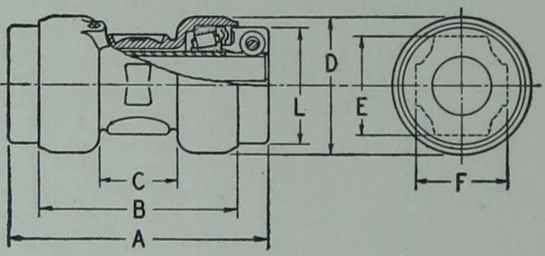
Suitable grease enclosures are used and bearings are properly lubricated when assembled. Re-lubrication is only required at infrequent intervals.

Consideration should be given to lineal expansion or contraction of shafting due to changes in room temperature between summer and winter and between when shop is in operation and when shut down. Ordinarily the center of line may be regarded as a neutral point, the shaft expanding or contracting each way from this point. In using table one-half the total length of shaft should be considered.

In the case of lineshafts, expansion is generally taken care of by the springing of the hanger frames. Where these are reasonably long drop and bolted to wooden stringers, there is usually sufficient flexibility to take care of lines a hundred feet or so in length. In other cases where short drop hangers rigidly supported are used, except in those cases where the supporting structure is steel with members running parallel with the shaft, expansion couplings should be used.

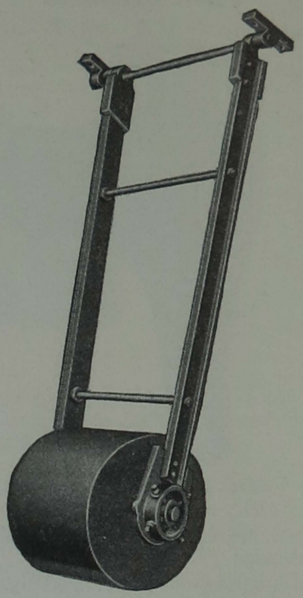
Hanger bearings 1 7/16 to 3 7/16-inch size are interchangeable size for size in all Dodge and practically all other types of drop, post, and bracket hanger frames.

Size 3 15/16-inch hanger bearing fits size for size in Dodge heavy headshaft hangers and ball and socket, short drop head shaft hangers.



Size Inches	Each	Shaft Sizes Included Inches	Dimensions, Inches A	D	C	F	E	L	B
1 7/16	**$15.50**	1 3/16 -1 7/16	7 1/4	3 5/8	2 1/4	2 5/16	2 3/4	3 1/8	5 3/8
1 11/16	**16.50**	1 1/2 -1 3/4	7 1/2	4 1/8	2 1/4	2 11/16	3	3 1/2	5 3/4
1 15/16	**19.00**	1 13/16-1 15/16	8 1/4	4 5/8	2 3/4	2 15/16	3 3/8	3 7/8	6 1/4
2 3/16	**22.50**	2 -2 1/4	8 7/8	5 1/8	3	3 5/16	3 3/4	4 3/8	6 7/8
2 7/16	**27.50**	2 5/16 -2 7/16	9 5/8	5 3/8	3	3 1/2	4 1/8	4 5/8	7 5/8
2 15/16	**37.50**	2 1/2 -2 15/16	10 3/8	6 1/4	3 1/4	4	4 5/8	5 7/16	8 1/4
3 7/16	**48.00**	3 -3 7/16	11 1/4	6 3/4	4	4 1/2	5 1/8	5 15/16	9 1/4
3 15/16	**105.00**	3 1/2 -4	16 1/2	8 7/8	6	6 1/4	7	7 7/16	13 1/4

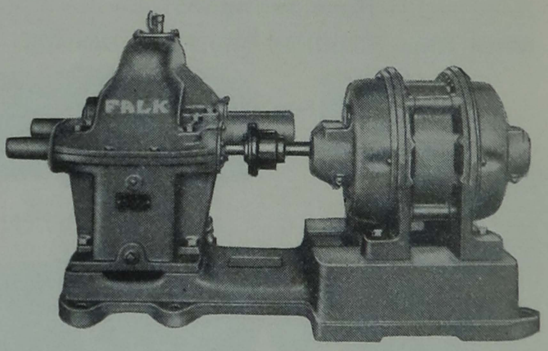
Medart Swinging Belt Tighteners



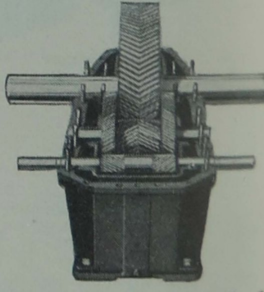
Made with an iron frame and adjustable self-oiling bearings. The belt is tightened by the weight of the tightener

Width Belt In.	Length of Frame, Feet 3 Each	4 Each	5 Each	6 Each	Size Pulley Inches	Siz Bearin Inche
4	**$29.00**	**$31.00**	**$33.00**	**$35.00**	10x 5	1 3/16
6	**30.00**	**32.00**	**34.00**	**36.00**	10x 7	1 3/16
8	**36.00**	**39.00**	**42.00**	**45.00**	12x 9	1 7/16
10	**40.00**	**43.00**	**46.00**	**49.00**	14x11	1 7/16
12	**53.00**	**57.00**	**61.00**	**66.00**	18x13	1 11/
16	**65.00**	**69.00**	**72.00**	**77.00**	20x17	1 11/
20	**88.00**	**95.00**	**102.00**	**109.00**	24x21	1 15/
24	**120.00**	**127.00**	**134.00**	**141.00**	30x25	1 15/

Falk Speed Reducers



Designed to transmit safely full rated capacity unde continuous service with 100 per cent overload at startin and 100 per cent momentary overload during operation



Metal sections are generous and heavy ribs are placed at all points of maximum stress. Bearings and oil retainers are split to afford extra accessibility. Base and cover are doweled. All steel herringbone gears with continuous teeth insure silent running and symmetrical arrangement of gears insure equal pressure on bearings. Shafts are double ended permitting reversal of gear teeth.

Lubrication is automatic and continuous. Aluminum baffles made in halves keep oil in and dirt out. Bearings ar babbitt lined, of the airplane type; interchangeable.

A number of standard reduction ratios are available fo each size reducer. Bearings, oil retainers, keys, studs shaft guards, covers, inspection covers, air vents, oil plug and other parts are interchangeable between units.

Prices and further information upon application.

Falk Motoreducers

The three types of Falk Motoreducers have been designed for combination with standard makes of motors.

The motor frame is supported from the speed reducer housing, the motor bed being eliminated. This is the most rigid form of construction for a combined unit of this kind.

Motoreducers are available from ¾ to 75 h.p. for motor speeds from 580 to 1750 r.p.m. and speeds of driven shaft from 2 r.p.m. to 4000 r.p.m. Much higher ratios are obtainable in combined units.

Gears are of alloy steel with precision single helical type involute cut teeth, providing maximum contact and overlap, and are arranged in simple trains.

Lubrication is automatic, continuous, of special Falk design. The system insures an adequate supply of lubricant at all times and is multi-sealed to be completely leakproof.

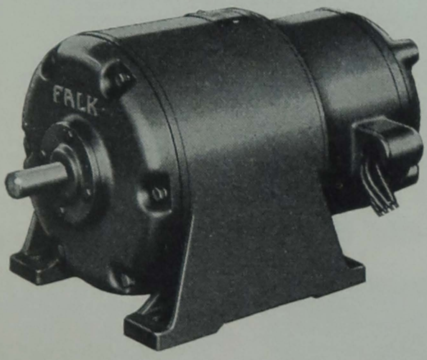
Ratings are conservative, the stresses in all parts being kept low enough to provide for severe service. In no case can the motor produce a shock load beyond the capacity of gears, bearings or the reducer elements.

Any ratio between 1.5 to 1 and 288 to 1 can be obtained in any standard Motoreducer.

Interchangeability of parts is an important feature.

When selecting Motoreducers it is necessary to know the h.p. and low speed shaft r.p.m. Sometimes the latter is stated in terms of motor speed and ratio. In addition, when the take off is other than by direct coupling connection, the amount of actual chain pull must be specified or the type of take off (sprocket, pulley, pinion) and diameter thereof must be known.

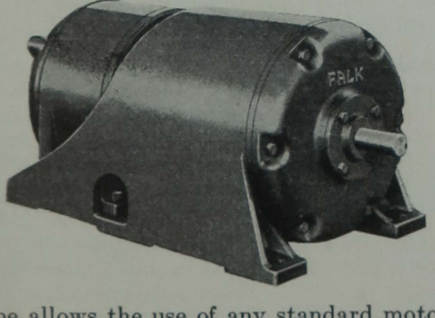
Integral Type



In the Integral Motoreducer a motor with standard round frame is used. The end bell is removed and the motor close-coupled to the reducer through a mounting ring adapter with bayonet type joint.

The pinion is carried at the end of a heavy motor shaft by oversize bearings that are separated by the length of the motor thus assuring maximum tooth contact and freedom from deflection.

All-Motor Type

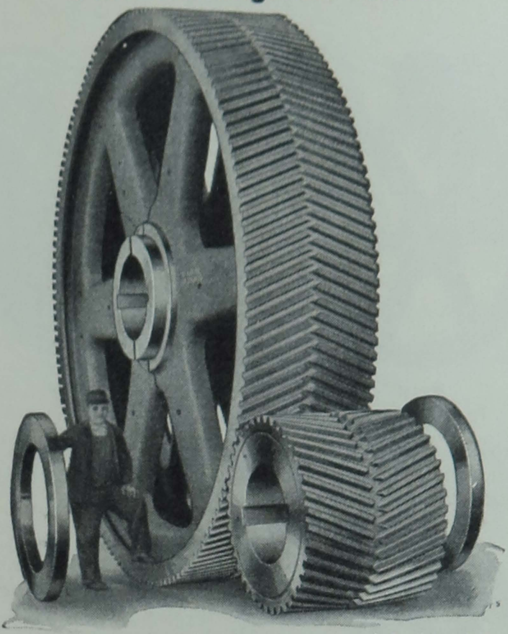


This type allows the use of any standard motor without any change whatever. The motor is carried in an extension of the reducer housing thus providing a unit of the utmost rigidity and providing virtually an integral mounting for two separate units, simplifying alignment problems. The elimination of joints and the combination of cylindrical and parabolic curves makes this unit unusually good looking

A Falk Resilient Coupling joins the standard motor shaft with the pinion shaft not only guarding against misalignment but affording torsional flexibility.

Complete bulletins sent on request.

Falk Herringbone Gears



Cut with staggered and continuous teeth hobbed from solid blanks.

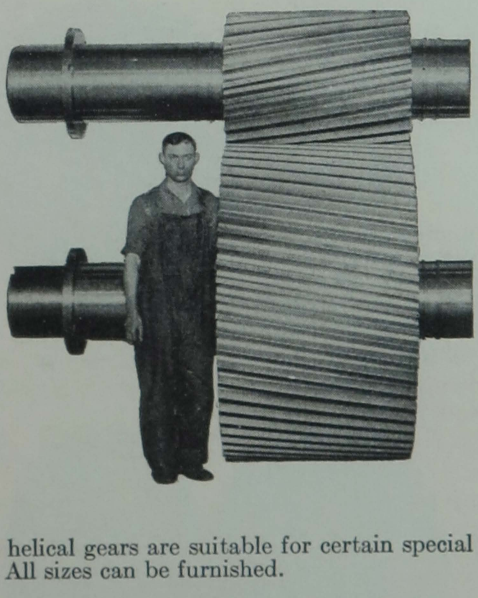
Made in diameters from 1 inch to 16 feet, in faces from 1 inch to 6 feet, and in pitches from 25 D.P. to ¾ D.P.

The engagement of teeth is continuous. There is no definite point where the load is transmitted from one pinion tooth to the next. For this reason the gears run with absolute freedom from vibration, hammering and back-lashing.

By using herringbone gears the efficiency, durability and range of velocity is increased and at the same time the use of soft pinions and objectionable noises are eliminated.

Information and prices furnished upon the receipt of specifications.

Falk Single Helical Gears



Single helical gears are suitable for certain special kinds of service. All sizes can be furnished.

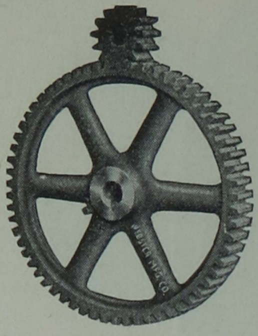
Information and prices furnished upon receipt of specifications.

Dodge Power Transmission

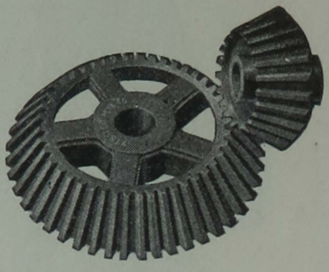
We carry a complete stock of Dodge Power Transmission.

Call our transmission department and let us figure on your requirements.

Cast Iron Gears

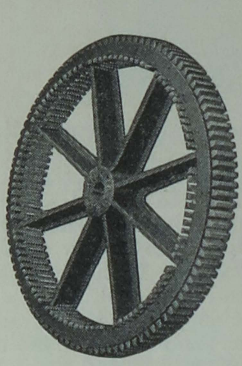


Spur



Bevel

In ordering spur gears, be particular to state the number of teeth, pitch, face and bore of gear, also whether desired key-seated or set-screwed.



Spur Mortise

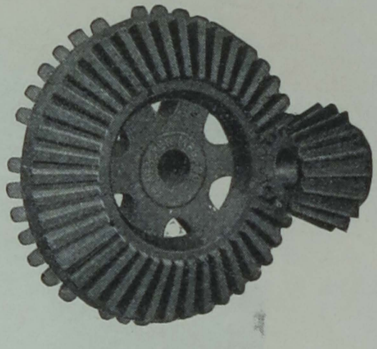
In ordering bevel gears, be particular to state the number of teeth, pitch, face and bore of both the wheel and the pinion.

Also state the backing or the projection of the hub back of the pitch line, and whether desired key-seated or set-screwed.

In ordering miter gears, be particular to state the number of teeth, pitch, face and bore.

Also state the backing of the projection of the hub back of the pitch line and whether desired key-seated or set-screwed.

All spur mortise gears are filled with a selected quality of hard maple cogs, and are trimmed on a modern gear cutter, insuring perfect shape.

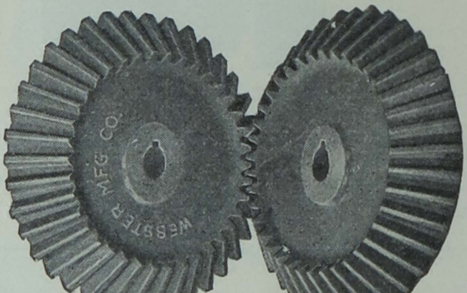


Bevel Mortise

All bevel core wheels are made from approved patterns, and filled with the best hard maple cogs.

All pinions to run with the core wheels have dressed teeth and are made accurately.

Split gears of all types, which meet special requirements for offset hubs, jaw clutch hubs, shrouded pinions, etc., can also be supplied.

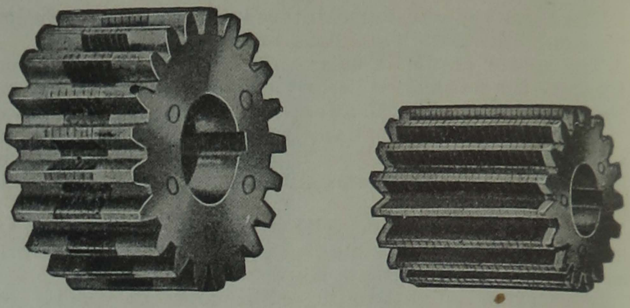


Miter

Also gears of cast steel, manganese steel, bronze, rawhide and other materials, with machine cut teeth, can be supplied.

Prices upon application.

Rawhide Gears



This rawhide pinion was first made to replace a metal one in a gear drive which was giving a customer considerable annoyance on account of noise.

The experiment proved successful; not only was the noise practically eliminated, but it was demonstrated that rawhide had as much strength and gave equally as much wear as metal used for the same purpose.

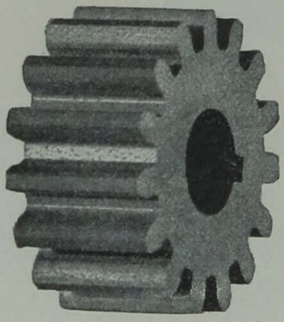
The engineering world soon recognized other superior features of rawhide over metal in gear drives. Rawhide being a non-conductor, was found to be the safest material for use around electrical machinery.

It was also demonstrated that there was sufficient flexibility in rawhide to relieve the machine of vibration, by doing away with the jar consequent upon the meshing of metal gears, thereby prolonging the life of the machinery and making a great saving in the cost of repairs and renewals.

To obtain a noiseless gear drive it is necessary to have only one of a pair of gears made of rawhide, and because of the relatively higher cost over metal, it is usually the smaller of the two. For the other a cast iron cut gear is recommended in most instances, since it will transmit any load that a rawhide pinion of like pitch will deliver and because of its economical cost. When ordering give width of rawhide face, number of teeth, outside diameter, size of hole and width of keyseat.

Prices and special bulletin furnished on request.

Colorado Micarta Silent Industrial Gears



Micarta is a product developed by the Westinghouse Electric & Manufacturing Company for making quiet gears. It has an advantage over other non-metallic gear materials in that it is self-supporting. No shrouds are required for the teeth and in most cases, no end plates whatever are necessary. This property permits the making of many special designs which would not be possible with other non-metallic material.

Micarta Gears are not affected by water, oil or most acid or alkali solutions, and are not attacked by rodents.

The durability of Micarta Gears has been proven in many severe applications. Even in cement mills, where cement dust rapidly cuts steel gearing, Micarta Gears have given unusual satisfaction. Micarta gears may be used wherever metal gears have been successfully employed. Gears of this material have given first class service in such severe applications as bridge, crane motors and power pumps.

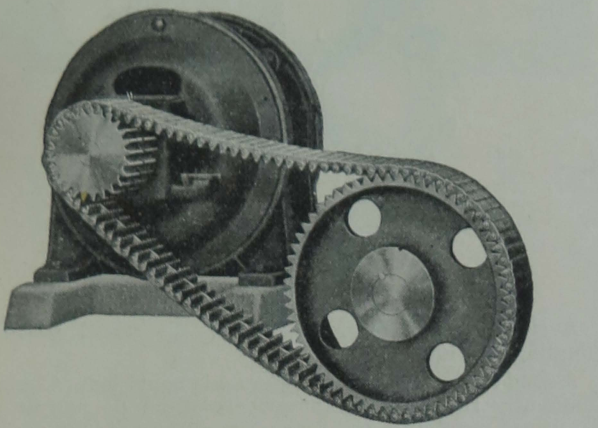
Power efficiency has been the watchword in engineering development and has resulted in the modern types of power transmission devices. Manufacturers have been vitally interested in the efficiency and durability of the apparatus they use, but the man efficiency has not always been given due consideration. The enervating strain on the workmen results in a monetary loss through waste of labor, materials and power. Silent gears are essential in keeping down this waste, and for many years Micarta has been the standard material for quiet running gears.

Shipment on standard gears can be made from Denver one day after receipt of order.

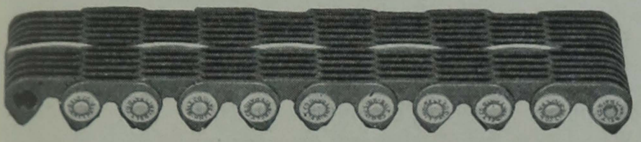
Prices and special bulletin upon application.

Link-Belt Silverstreak Silent Chain Stock Drives

Flexible as a Belt—Positive as a Gear



Available from stock in practically any ratio up to 7:1 for up to 60 h.p. Other ratios up to 15:1 for up to 1000 h.p. and more are manufactured to order.



Made up of a series of leaves or plates, the joints of which consist of segmental case-hardened liners or bushings, and case-hardened steel-pins. The broached holes in the heads of the links are of a form which provides a lock grip for their own bushings, and a clearance space for the bushings of the adjacent pitches.

The segmental liners or bushings, which are removable, extend across the entire width of the chain, thus doubling the bearing surface and halving the bearing pressure per square inch of joint surface. The bushings are case-hardened and bear upon the case-hardened pin. The latter is free to and does rotate with reference to the bushings and presents every particle of its surface for wear. As a result it wears uniformly, keeps round, and the chain maintains its high initial efficiency to the end.

The wheels are properly designed, and the teeth carefully cut by an accurately generated cutter. The larger wheels are usually made of semi-steel, and pinions of steel.

This chain is superior to leather or rubber belting because it cannot slip and can be run on short centers; permits high ratio of speed reduction in a single drive; can be used in hot, cold or damp places; is run slack, and therefore without excessive journal friction; there is no dangerous sparking and it transmits power with less loss.

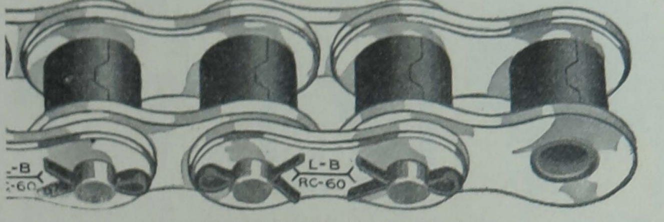
Superior to spur gearing because it operates quietly; can be run at a high speed; center distance can be arranged to suit convenience of design; more teeth are in working contact, resulting in smoother action and less wear; self-contained bases are not necessary, and with the same amount of power applied, it delivers more power to perform useful work.

This chain shows the highest sustained efficiency of all mediums for the transmission of power, 98.2 per cent on actual test. Chain drives can be run at relatively high speeds; will run in either direction; are not affected by heat, cold or moisture; will transmit any amount of power; give a positive velocity ratio; can be used on short or long centers; reduce journal friction to a minimum, and action remains perfect even after long use.

Prices and special catalog upon application.

Link-Belt Silverlink Roller Chains

RC Class



Single Width Roller Chain

Link-Belt Silverlink roller chains are a successful means of mechanical power transmission, for they are long-lived, positive, and efficient. They stand up under adverse operating conditions within their speed limitations.

They are durable and satisfactory chains for the severe, jerky, and racking strains of truck and tractor service, giving great wearing value and resistance to fatigue in this class of work. In steel mills, where the service is recognized as most severe, Link-Belt roller chains have been used successfully. Correctly applied within their rated capacities and speeds, they are highly successful and durable, even in this rugged service.

Roller chains should be used within their proper range of application, so as to give the maximum service per dollar of investment. They carry heavy loads at moderate chain speeds, and are durable and efficient on second reduction drives and similar applications.

On high speed drives such as the first reduction from electric motors, or on drives where extreme smoothness of transmission is called for, the Link-Belt silent chain drive is the better selection. It will last longer and run more quietly. Roller chains are sometimes used on drives for which Link-Belt silent chain drive would serve better. There is a correct use for each type of drive in industrial power transmission.

To secure best results, Link-Belt roller chain should only be used on accurately cut sprocket wheels. The chain is standard, and wheels must be cut to fit the chain. To insure accuracy of fit, the wheels should be cut by the maker of the chain.

A standard for roller chains was adopted by various manufacturers in conjunction with the Standards Committees of the American Society of Mechanical Engineers, and the Society of Automotive Engineers. This standard controls dimensions of parts, making the chains interchangeable as far as coupling with each other is concerned.

Multiple Width Roller Chain

Multiple width roller chains, which are known as double, triple, and quadruple widths, can be furnished. Multiple width chains can be used to advantage where speeds and loads are high. Their increased strength permits the use of shorter pitch chain, and more teeth in sprockets without increase in diameter. Multiple width chains are built upon a single pin, and are usually manufactured in the detachable type, but will be furnished riveted if so desired.

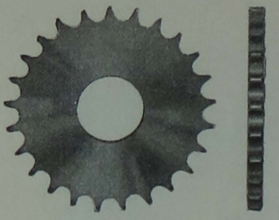
Single Width, Manufacturers' Standard Sizes

The following chains, which are in accordance with Manufacturers' Standards, are well proportioned for strength and durability. They are carried in stock and can be furnished without delay.

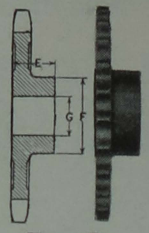
No.	Pitch In.	Plain Chain Cotter Type per Ft.	Plain Chain Riveted Type per Ft.	Connecting and Coupler Links Each	Roller Links Each	Offset Links Each	Average Ultimate Strength Lbs.	Wt. Lbs. per Ft.
RC- 60	¾	$1.00	$.90	$.10	$.10	$.32	7,000	1.0
RC- 80	1	1.70	1.60	.16	.20	.52	12,500	1.7
RC-100	1¼	2.00	2.00	.22	.30	.68	23,000	2.7
RC-120	1½	2.60	2.60	.34	.50	.80	32,500	3.75
RC-140	1¾	3.00	3.00	.48	.60	.90	45,000	4.65
RC-160	2	3.60	3.60	.60	.90	1.00	55,000	6.4
RC-250	2½	7.70	7.70	1.80	2.30	3.20	90,000	11.0

Detachable chain is standard and will be furnished unless riveted chain is ordered.

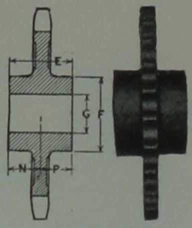
Link-Belt Roller Chain Sprocket Wheels



Type A

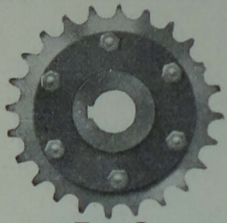


Type B



Type C

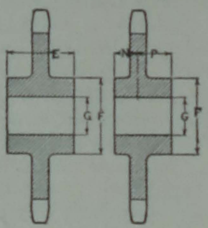
Type A is a plate wheel. Bolt holes and bores can be made to suit specifications. Can be made split if so desired. Type B sprocket wheel has a hub on one side, and can be made in cast iron or cast steel. Type C sprocket wheel has hub on both sides. This type of wheel can be made split if desired.



Type D

The Type D wheel is known as the Link-Belt Double-Duty Wheel. The principle of its construction is to provide a removable rim section which can be easily replaced, for renewal, or for change of speed ratio. The hub section (or spider) can be used indefinitely, and new rim sections (which are split) can be added without the removal of the hub.

Each sprocket wheel consists of a split steel rim section in which teeth are cut, attached by suitable bolts to a cast iron hub or spider, which is bored and keyseated to order. Practically any ratio is obtainable.



When sending specifications for sprocket wheels, the following information is necessary: (1) Quantity. (2) Material. (3) Type of Sprocket. (4) Solid or split. (5) No. of teeth. (6) No. of chain, pitch of chain, diameter and width of roller. (7) Bore G. (8) Length of hub through bore E. (9) Length of hub projection from center line, if hubs are offset. Give dimensions N and P. (10) Maximum hub diameter F, if space is limited. (11) Keyseated or setscrewed. If keyseated, whether straight or tapered. Give width and depth of keyseat. In case of taper keyseat where hub is not located centrally, specify from which end tapered. (12) Bolt hole specifications for plate sprocket.

Speed Ratios

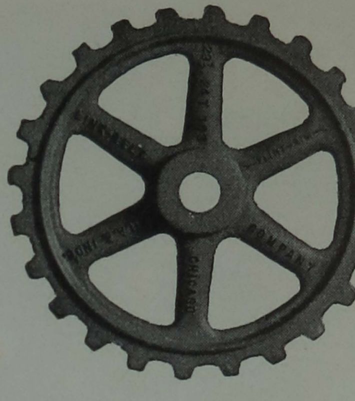
Cut tooth Silverlink roller chain wheels are carried in stock in a wide range of sizes, selected to provide practically any ratio up to approximately 8:1, with hubs and bores suitable for general requirements. Made to order wheels can be furnished. The following ratio table, while not complete for all stock wheels, is shown for convenience in determining sprocket sizes.

No. Teeth in Driven Wheel	No. of Teeth in Driving Wheel												
	11	13	15	16	17	18	19	26	35	45	59	70	81
11	1	1.18	1.36	1.45	1.54	1.64	1.73	2.36	3.18	4.09	5.36	6.36	7.36
13	...	1	1.15	1.23	1.31	1.39	1.46	2.00	2.70	3.46	4.54	5.38	6.24
15	...	...	1	1.07	1.14	1.20	1.27	1.73	2.33	3.00	3.93	4.67	5.40
16	...	...	...	1	1.06	1.12	1.19	1.62	2.19	2.81	3.69	4.37	5.06
17	...	...	...	...	1	1.06	1.12	1.53	2.06	2.65	3.47	4.12	4.76
18	...	...	...	...	...	1	1.05	1.44	1.94	2.50	3.28	3.89	4.50
19	...	...	...	...	...	...	1	1.37	1.84	2.36	3.10	3.68	4.26
26	...	...	...	...	...	...	...	1	1.35	1.73	2.27	2.69	3.11
35	...	...	...	...	...	...	...	...	1	1.29	1.68	2.00	2.31
45	...	...	...	...	...	...	...	...	...	1	1.31	1.55	1.80
59	...	...	...	...	...	...	...	...	...	...	1	1.19	1.37
70	...	...	...	...	...	...	...	...	...	...	...	1	1.16
81	...	...	...	...	...	...	...	...	...	...	...	...	1

To select a pair of wheels for a desired ratio of speeds, find the figures which come nearest to the ratio, and the corresponding figures in the margins will give the numbers of teeth in the sprocket wheels. For instance, the ratio of 250 to 110 r.p.m. is 2.27. From the above table, it will be seen that 26 and 59 teeth will meet this requirement. If the conditions require smaller wheels, and the exact ratio is not important, 35 teeth could be selected for the larger wheel, and 15 or 16 for the smaller, as close approximations.

Prices and special bulletin upon application.

Sprocket Wheels for Ewart Link-Belt



A chain should entirely encircle the wheel to reach a coupling position.

A good chain drive should run and should last. Chains will frequently run on sprocket wheels which do not fit them. To insure durability and maximum service of both chain and wheel, they must fit.

A sprocket wheel with hardened face that does not fit the chain, lasts, but at the expense of the chain. The chain is the standard, and the sprocket wheel must be made to fit it.

Ewart Link-Belt should, wherever possible, run with the back of the coupling hook to the wheel.

Where it is necessary to run a wheel in contact with the face side of a chain (the side on which the coupling hook is open), use face wheels. Split wheels are a great convenience where it is not easy to remove the shaft.

Wheels are fitted with jaw clutches, or friction clutches, to suit conditions.

Long tooth, hook tooth and flanged wheels are extensively used in saw mill work.

Suggestions for Ordering Wheels

In ordering wheels, mention:

1. Number of wheels of each kind wanted.
2. Metal wanted.
3. Pitch diameter (from catalog list, or figures cast on wheel).
4. Number of teeth (counted, as a check on the diameter).
5. Number of chain used.
6. Diameter of bore.

If casting only is wanted, state diameter and shape of shaft for which it is to be cored (giving other particulars as here suggested).

If wheel is to be bored, state whether keyseated or setscrewed.

If keyseat is wanted, specify whether straight or taper and whether in line with another wheel. (Straight furnished with set screw over keyseat unless otherwise ordered.)

If keyseat is of different size from standard, give width and depth.

If wheel is wanted split, be sure to mention it; otherwise it will be furnished plain or solid.

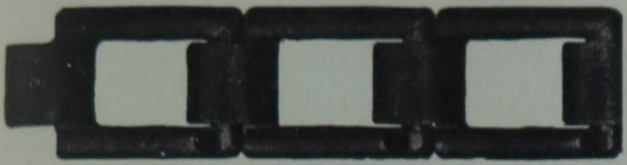
Some wheels should be ordered plate center—when full strength of chains is required, it is necessary to use wheels from heavier patterns, or make wheels plate center.

If hub is special, send sketch with particulars, such as diameter, length, projection from center on either or both sides, indicating whether faced at both ends or one (and which one).

If jaw clutch hub is desired, give diameter; number and depth of jaws; state whether square or spiral, whether right or left hand. Give length of hub to bottom of jaws. If clutch is not of Link-Belt pattern give details of measurement.

If gap wheel is wanted, send sketch showing where wheel is to go in the carrier, stating diameter of wheel and number of gaps. Give projection from center line of chain to edge of flight, also thickness of flight, for which the gap is needed.

Detachable Chain



Standard Sizes

No.	Approx. Links in 10 Feet	Avge. Pitch In.	Avge. Ultimate Strength Pounds	Average Wt. Lbs.		Plain Link Belt Price per Ft.	Couplers Price per Pair
				Link Belt per 100 Feet	Couplers per 100 Pairs		
25	133	.902	700	24	5	$.17	$.17
32	104	1.154	1100	32	10	.17	.17
33	86	1.394	1190	32	13	.16	.16
34	86	1.398	1300	40	13	.18	.18
42	88	1.375	1500	55	18	.19	.19
45	74	1.630	1600	52	21	.18	.18
50	87	1.380	1900	71	..	.22	.22
51	104	1.155	1900	70	18	.24	.24
52	80	1.506	2300	80	30	.23	.23
55	74	1.631	2200	70	28	.20	.20
57	52	2.308	2800	87	48	.26	.26
62	73	1.654	3100	104	41	.27	.27
67	52	2.308	3300	115	60	.30	.30
75	46	2.609	4000	134	70	.33	.33
77	52	2.297	3600	145	72	.35	.35
78	46	2.609	4900	186	95	.44	.44
85	30	4.000	7600	247	229	.62	.62
88	46	2.609	5750	230	130	.50	.50
95	30	3.967	8700	290	275	.68	.68
103	39	3.075	9600	400	268	.73	.73
108	25½	4.720	9900	348	384	.80	.80
114	37	3.250	11000	525	387	.92	.92
124	30	4.063	15000	640	580	1.08	1.08

Special Sizes

23	185	.649	460	25	...	$.27	....
024	133	.902	670	24	...	.22	....
025	120	1.000	670	24	...	.27	....
31	132	.908	775	32	...	.27	....
032	133	.902	1000	52	...	.32	....
34½	104	1.154	1250	46	...	.25	....
35	74	1.630	1000	40	15	.20	$.20
042	88	1.375	1500	65	...	.32	....
44	81	1.481	1580	55	19	.23	.23
45 Keeper	74	1.630	1600	53	...	.24	....
046	74	1.631	2100	86	...	.27	....
47	74	1.630	1600	55	...	.24	....
48	60	2.000	1600	53	...	.23	....
S-51	106	1.136	1900	76	...	.32	....
052	79	1.516	2300	95	...	.30	....
52½Light	80	1.506	2260	76	...	.24	....
52½Heavy	79	1.519	2860	116	42	.32	.32
055	74	1.633	2100	84	...	.25	....
55 Keeper	74	1.631	2200	74	...	.24	....
55½	74	1.632	2040	75	...	.27	....
56½	72	1.661	2450	106	...	.31	....
057	74	1.618	2200	80	...	.25	....
58	75	1.600	2250	80	...	.35	....
062	73	1.654	3300	130	...	.36	....
62 Keeper	73	1.654	3100	106	...	.36	....
62½	73	1.654	3100	103	...	.32	....
063	80	1.509	2330	126	40	.37	.37
65	57	2.128	2460	92	...	.30	....
66	60	2.013	2600	117	49	.35	.35
071½	58	2.084	4800	192	...	.54	....
072	73	1.654	4340	195	71	.52	.52
72	59	2.043	4240	160	...	.45	....
072½	72	1.674	4300	195	...	.52	....
72½	73	1.654	4590	200	74	.55	.55
075	58	2.073	4590	190	...	.53	....
76½	58	2.073	3890	150	72	.42	.42
83	30	4.000	4950	190	172	.55	.55
88½	46	2.609	7200	340	203	.77	.77
104½	26½	4.520	11500	500	493	1.10	1.10
110	25½	4.720	11000	442	426	1.00	1.00
122	20	6.050	15000	670	873	1.46	1.46

Attachments for Ewart Link-Belt

The sizes below are standard and carried in stock.

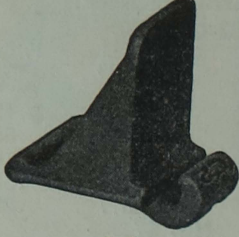
No.	Wt., Lbs. per 10 Feet	Price per Foot
No. 25		
Plain	2.4	$.17
†Couplers	.1	.17
*A-1	3.9	.36
C-1	4.5	.39
H-2	5.3	.42
*K-1	4.8	.40
No. 32		
Plain	3.5	$.17
†Couplers	.1	.17
*A-1	5.0	.36
C-1	7.8	.39
*K-1	7.9	.43
No. 33		
Plain	3.3	$.16
†Couplers	.1	.16
K-1	6.0	.37
*S-1	6.1	.40
No. 34		
Plain	4.0	$.18
†Couplers	.1	.18
K-1	7.4	.41
No. 42		
Plain	5.5	$.19
†Couplers	.2	.19
*A-1	7.0	.35
C-1	10.8	.44
*K-1	9.6	.42
*S-1	8.2	.43
No. 45		
Plain	5.2	$.18
†Couplers	.2	.18
*A-1	7.5	.35
C-1	9.4	.37
*E-1	7.5	.31
F-2	9.4	.46
*K-1	9.0	.39
*K-40	15.5	.65
K-45½	22.0	1.15
*K-91	18.0	.85
*S-1	7.8	.40
No. 50		
Plain	7.1	$.22
No. 51		
Plain	7.0	$.24
†Couplers	.2	.24
No 52		
Plain	8.0	$.23
†Couplers	.3	.23
*A-1	10.4	.42
F-2	16.0	.59
*K-1	12.7	.50
No. 55		
Plain	7.2	$.20
†Couplers	.3	.20
*A-1	9.5	.37
C-1	11.5	.38
*E-1	9.8	.35
F-2	13.5	.52
*K-1	11.0	.42
*K-45½	25.5	.94
*S-1	10.0	.45
*S-5	11.5	.45
No. 57		
Plain	8.6	$.26
†Couplers	.5	.26
*A-1	12.5	.41
F-2	19.5	.63
*K-1	15.0	.51
No. 62		
Plain	10.6	$.27
†Couplers	.4	.27

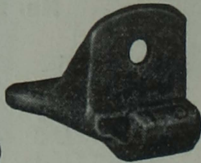
No.	Wt., Lbs. per 10 Feet	Price per Foot
No. 62-Cont.		
*A-1	15.0	$.48
C-1	18.0	.50
*D-5	20.4	.74
*K-1	16.9	.54
*K-40	26.7	.80
No. 67		
Plain	11.5	$.30
†Couplers	.6	.30
*A-1	15.5	.51
F-2	21.8	.65
*K-1	19.0	.58
No. 75		
Plain	13.4	$.33
†Couplers	.8	.33
F-2	26.0	.70
H-1	22.8	.70
*K-1	18.5	.57
No. 77		
Plain	14.5	$.35
†Couplers	.7	.35
*A-1	18.9	.56
F-2	31.1	.78
G-1	25.5	.66
*K-1	21.3	.66
No. 78		
Plain	18.8	$.44
†Couplers	1.1	.44
F-2	36.0	.84
*K-1	25.0	.66
M-3	37.0	1.20
*R-1	21.5	.58
No. 85		
Plain	24.7	$.62
†Couplers	2.3	.62
*K-2	37.9	1.02
No. 88		
Plain	24.0	$.50
†Couplers	1.3	.50
*A-11	33.0	.78
F-2	41.4	.94
H-2	44.0	1.02
*K-1	33.5	.78
M-3	43.0	1.54
*R-1	26.0	.68
No. 95		
Plain	30.0	$.68
†Couplers	2.8	.68
*K-2	46.5	1.12
No. 103		
Plain	40.0	$.73
†Couplers	2.7	.73
F-2	61.0	1.30
F-8	70.1	1.52
G-6	64.0	1.40
H-2	57.0	1.30
*K-1	52.0	1.12
K-2	55.4	1.16
No. 108		
Plain	36.0	$.80
†Couplers	3.8	.80
*K-2	55.7	1.16
No. 114		
Plain	53.0	$.92
†Couplers	3.9	.92
F-8	81.0	1.90
*K-1	71.9	1.50
No. 124		
Plain	66.0	$1.08
†Couplers	5.8	1.08
F-8	116.6	2.36
*K-1	97.6	1.90

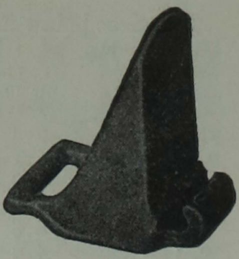
†Prices and weights of coupler links are per pair.

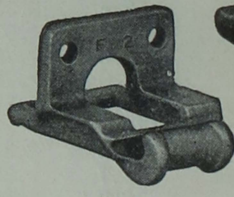
*Attachments marked with * can be coupled together consecutively if desired.

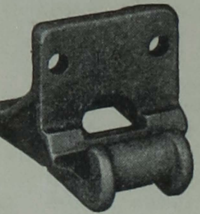
Ewart Link-Belt Attachments

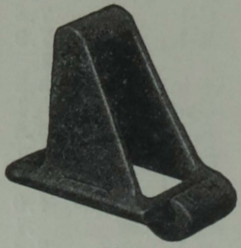

C 2

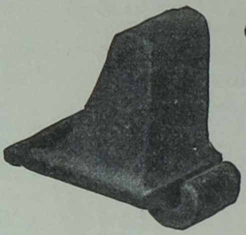

C 1

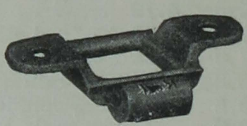

C 5

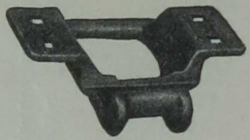

F 2

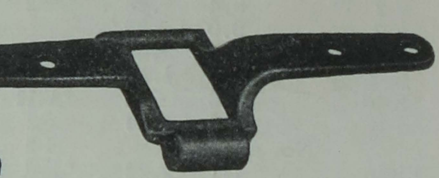

F 8

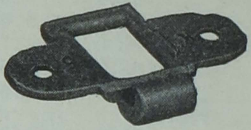

H 1

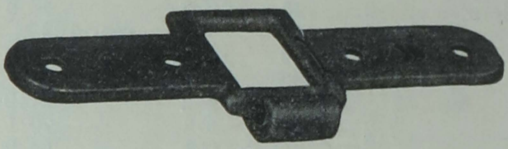

H 2

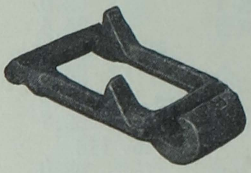

K 1

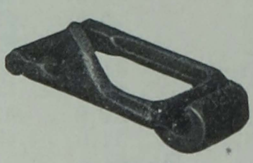

K 2

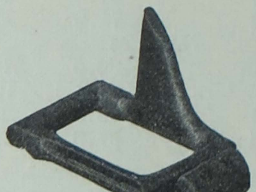

K 3

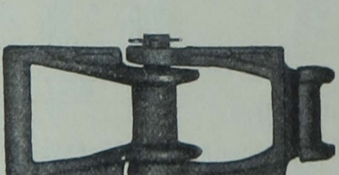

K 5


K 6


R 2


R 1 R. H.


R 3 L. H.


Pair of Plain Coupler Links

Useful Information

Suggestions for Use of Chain-Belting

Always lubricate chain-belting, using heavy oil or grease. Where the chain is exposed to much grit and dirt, plumbago or graphite grease is found the most suitable. The chain should be run with the back of the coupling hook to the wheel. Where chains are used only as driving chains, run the hook end of the link first. For elevator and conveyor chains, it is considered better practice to run the link with the bar end first, except in cases where the material handled is of a gritty character, and might get into the chain joint. In this case run the hook end first.

The chain should be run slighty looser than is customary with flat belts. The chain should only be tight enough so that there is no undesirable flapping or jumping.

Do not expect the chain to carry, as a working load, the average ultimate strength. The average ultimate strength is the average breaking load of the chain, as determined through a series of tests. The working load should be from 1/6 to 1/20 of the average ultimate strength, depending on the speed at which the chain is to run, and the character of the service.

For chains used as drive chains, the working load should not exceed the following:

Speed of Chain, Ft. per Min.	Divide Aver. Ult. Strength by Factor	Speed of Chain, Ft. per Min.	Divide Aver. Ult. Strength by Factor
200 and under	6	400 to 500	12
200 to 300	8	500 " 600	16
300 " 400	10	600 " 700	20

Example: The average ultimate strength of No. 88 Chain is 5,750 pounds. Its working load at 200 feet per minute should not exceed 960 pounds—at 400 feet per minute, 575 pounds—at 700 feet per minute, 287 pounds.

Where the load to be transmitted is irregular or subject to shock, a still further reduction in the working load should be made. With elevators carrying material which is liable to choke up, allowance must be made for this fact in designing.

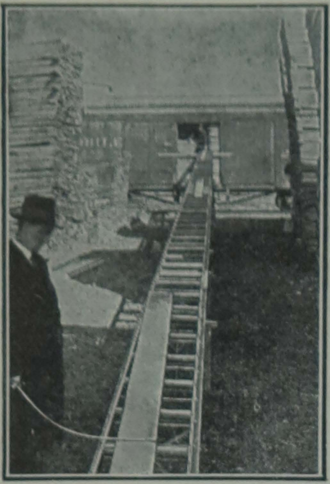
Approximate Horse-power of Detachable Chain

The following table of approximate horse-power is figured on the basis above, and should be modified for unusual conditions, such as loads subject to shock, etc.

Chain No.	Approximate Horse Power Speed, Feet, per Minute 200	300	400	500	600	700
25	.7	.79	.85	.88	.79	.74
32	1.10	1.25	1.33	1.39	1.25	1.17
33	1.2	1.35	1.44	1.50	1.35	1.26
34	1.31	1.48	1.58	1.64	1.48	1.38
35	1.21	1.36	1.45	1.52	1.36	1.27
42	1.51	1.70	1.82	1.89	1.70	1.59
45	1.61	1.82	1.94	2.02	1.82	1.69
51	1.91	2.16	2.30	2.39	2.16	2.01
52	2.32	2.61	2.78	2.90	2.61	2.44
55	2.22	2.53	2.66	2.77	2.53	2.33
57	2.82	3.18	3.39	3.53	3.18	2.97
62	3.10	3.52	3.76	3.91	3.52	3.29
66	2.62	2.95	3.15	3.28	2.95	2.76
67	3.33	3.75	4.00	4.17	3.75	3.50
75	4.04	4.54	4.85	5.04	4.54	4.24
77	3.64	4.09	4.36	4.54	4.09	3.82
88	5.82	6.53	6.97	7.26	6.53	6.09
103	9.69	10.9	11.64	12.12	10.9	10.18
114	11.11	12.5	13.33	13.89	12.5	11.66
124	12.82	14.43	15.39	16.03	14.43	13.47

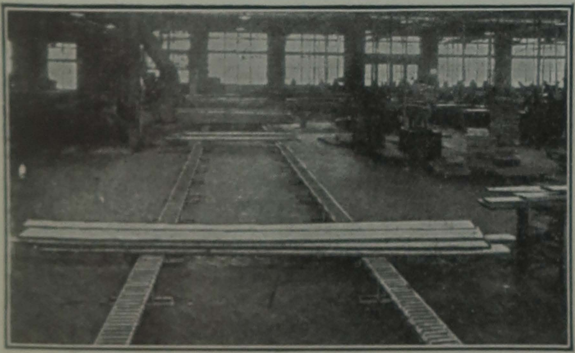
To figure the horse-power of chains not given in the above table divide the ultimate strength given in the price list of the chain used by the factor of safety at the speed at which the chain is to be run, see above. This will give the proper working load. Multiply the working load by the speed of the chain in feet per minute and divide by 33,000—the result will be the maximum horse-power which the chain will transmit.

Gravity Roller Conveyors



Logan Gravity Roller Conveyors save from $3.00 to $12.00 per car in unloading cost. Usually pay for themselves in three to six months' time. Light and strong. Quickly, easily set up. Ten-foot sections can be stored in small space.

Conveying Axe Handle Stock from Cars to Storage



A Special Adaptation of Logan Gravity Conveyors in a Wood-working Plant
Piles of Lumber are Handled on a Double Line of Conveyors from Cut-off Saw to Planers

Prices and special bulletin upon application.

Robins Belt Conveyors

A Fully Loaded 54-Inch Belt Conveyor in a Large Stone Quarry

Information for Designing or Estimating Belt Conveyors

For designing a belt conveyor and estimating its cost so that maximum efficiency and minimum cost per ton of material handled will be obtained, it is necessary that the answers to the following questions be known.

1. What is the horizontal distance material is to be conveyed?

2. What is the vertical height material is to be lifted?

The answers to No. 1 and No. 2 will determine the length of the conveyor from center to center of end pulleys and its degree of inclination.

3. What material is handled and what is its weight per cubic foot?

4. What is the average required capacity in tons per hour?

5. What is the maximum required capacity in tons per hour?

6. What is the average size of lumps in the material?

7. What is the maximum size of lumps in the material?

The answers to No. 3 to No. 7 inclusive will determine the width and number of plies in the belt, its speed and the power required to drive the conveyor.

8. Is the material hot, cold, wet, dry, sticky, oily, or corrosive?

9. How is the material fed to the belt?

The answers to No. 8 and No. 9 with consideration of the answer to No. 3 will determine the quality and thickness of the rubber cover on the belt.

10. Is the conveyor to be supported on steel or on wood structures?

11. What would be the most convenient location for the drive?

12. Is power to come from electric motor, steam engine, gas engine or line shaft?

13. If we furnish electric motor, what are current characteristics?

14. If owner furnishes motor or engine, what is its speed and size of pulley, shaft and keyseat?

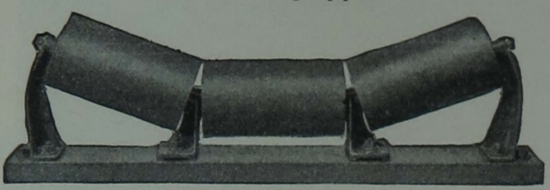
Use Our Engineering Service Freely

It will pay you to use the experienced men we have available to help you with your problems in handling material in the best and most economical way.

This is only a part of the facilities we have to assist you, and of course there is no charge for it.

No. S-253-XR Robins Three-Pulley Roller-Bearing Troughing Idlers

Timken Equipped

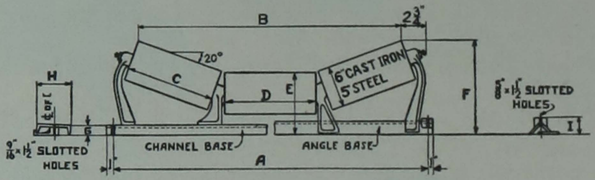


On Channel Base

The smooth finish and rounded corners on the steel tube pulleys, the narrow gaps between them and the proper angle of the side pulleys lengthen the life of belts. A slight forward tilt keeps the belt centered. Two high pressure fittings of a special type without ball checks are used on each idler, located at the ends. One application of a grease gun at either of the fittings insures complete lubrication of all bearings and no overgreasing.

Can also be furnished in a demountable form.

Dimensions and Prices



With 5 or 6-Inch Diameter Steel Pulleys

Belt Width In.	5-In. Pulley Each	6-In. Pulley Each	Dimensions, Inches A	B	C	D	Channel Base 5-In. Pulley E	F
18	$22.80	$27.00	27	19⅛	6½	6½	8¾	11
20	23.20	27.40	29	21⅛	6½	8½	8¾	11
24	24.00	28.20	33	24⅞	8½	8½	8¾	11¾
30	25.80	30.00	39	31⅜	10¾	10¾	8¾	12½
36	27.80	33.00	45	37⅞	13	13	8¾	13¼
42	29.80	36.00	51	43⅝	15	15	8⅞	14⅛
48	31.80	39.00	57	49⅜	17	17	8⅞	14⅞

Belt Width In.	Dimensions, Inches: Channel Base 6″-Pulley E	F	Angle Base 5″-Pulley E	F	Angle Base 6″-Pulley E	F	G	H	I	Wt. Lbs. Channel Base 5-In. Pulley	6-In. Pulley
18	9¼	11½	8¾	11	9¼	11½	1¾	4	2¾	69	76
20	9¼	11½	8¾	11	9¼	11½	1¾	4	2¾	72	80
24	9¼	12¼	8¾	11¾	9¼	12¼	1¾	4	2¾	78	87
30	9¼	13	8¾	12½	9¼	13	1¾	4	2¾	87	97
36	9¼	13¾	8¾	13¼	9¼	13¾	1¾	4	2¾	96	107
42	9⅜	14⅝	9½	14¾	10	15⅛	1⅞	5	3½	110	122
48	9⅜	15⅛	9½	15½	10	15¾	1⅞	5	3½	120	133

No. 253-XR With 6-Inch Diameter C.I. Pulleys

Belt Width In.	Each	Dimensions, Inches A	*A Old Style	B	C	D	Channel Base E	F
18	$29.80	27	30	19⅛	6½	6½	9⅜	11⅝
20	30.20	29	32	21⅛	6½	8½	9⅜	11⅝
24	31.00	33	38	24⅞	8½	8½	9⅜	12⅜
30	33.00	39	44	31½	10¾	10¾	9⅜	13⅛
36	36.20	45	50	37⅞	13	13	9⅜	13¾
42	39.40	51	56	43⅝	15	15	9½	14⅝
48	42.60	57	62	49⅜	17	17	9½	15¼
54	**	68	68	55⅛	19	19	9⅞	16⅜
60	**	74	74	60⅞	21	21	9⅞	17⅛

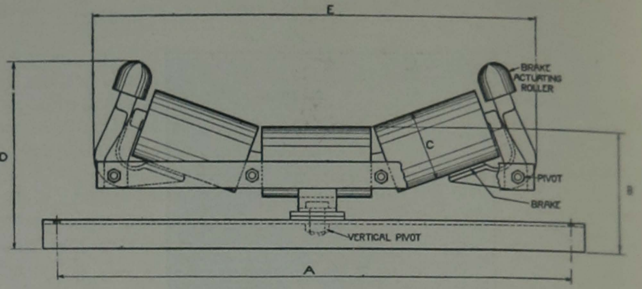
Belt Width In.	Dimensions, Inches: Angle Base E	F	G	H	I	Wt. Lbs. Channel Base	Angle Base
18	9⅜	11⅝	1⅞	5	2¾	98	94
20	9⅜	11⅝	1⅞	5	2¾	100	96
24	9⅜	12⅜	1⅞	5	2¾	111	106
30	9⅜	13⅛	1⅞	5	2¾	123	117
36	9⅜	13¾	1⅞	5	2¾	135	128
42	10⅛	15¼	2	6	3½	162	160
48	10⅛	15⅞	2	6	3½	175	170
54	10⅛	16⅝	2⅜	7	3½	225	201
60	10⅛	17⅜	2⅜	7	3½	260	215

*Similar idlers with a greater dimension A have been furnished in the past and are still available if preferred.

**Prices on application.

Robins Belt Trainers

For the Troughed Belt



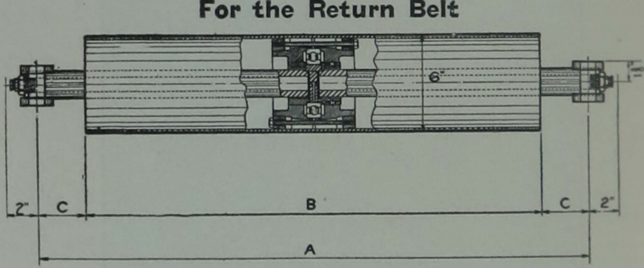
A roller-bearing troughing idler is mounted on a vertical pivot or swivel at its center. At each end of the idler, a ball-bearing actuating roller is supported by a pivoted lever which carries a brake shoe on its lower end.

A touch of the belt against this roller instantly applies the brake to the end pulley of the idler. This causes a slight drag on one side and swings the idler, steering the belt back to its central position.

The trainer does not wabble nor does the belt weave from side to side. The trainer assumes a stable position which keeps the belt in line. A few troughing trainers substituted for regular troughing idlers at a spacing of from 20 to 50 feet will maintain perfect alignment on the carrying strand of any belt conveyor.

Belt Width, In.	Each	Dimensions, In. A	B	C	D	E	Weight Pounds
16	$51.00	24	9	5	13⅞	24⅞	103
18	52.00	27	9½	5	14⅝	26½	107
20	53.00	29	9½	5	14¾	28¼	111
24	55.00	33	9½	5	15¼	32½	121
30	60.00	39	9½	5	16	38	135
36	65.00	45	9½	5	16⅝	44	149
42	72.00	51	9½	5	17⅜	49½	162
48	73.00	57	9½	5	18⅛	52½	176
54	74.00	..	...	.	....	....	200

For the Return Belt



A tubular roller is mounted on an anti-friction bearing pivoted on a fixed swivel pin, centrally located and inclined forward about 30 degrees. The roller not only rotates on its bearing but is free to rock about this inclined pivot. If the weight of the belt falls more on one side than on the other, the heavy side rocks downward and forward, skewing the roller and holding the belt in its central position.

When used on reversible conveyors, the end bracket design permits the shaft to rotate 60 degrees and the belt pull automatically throws the swivel pin into position for guiding the belt in the direction it is running.

A few trainers substituted for regular return idlers at a spacing of from 60 to 80 feet will make the return strand of any conveyor run perfectly true and straight.

Belt Width, In.	Each	Dimensions, In. A	B	C	Weight Pounds
14	$48.70	22	16	3	60
16	49.20	24	18	3	62
18	49.70	27	20	3½	65
20	50.20	29	22	3½	67
24	51.60	33	26	3½	73
30	53.40	39	32	3½	81
36	55.10	45	38	3½	89
42	56.90	51	44	3½	96
48	58.60	57	50	3½	104
54	60.30	63	56	3½	111
60	62.00	69	62	3½	119

For conveyors handling abrasive material, the trainer is offered with rubber covered pulleys that withstand abrasion much longer than iron or steel.

Robins Roller Bearing Return Idlers

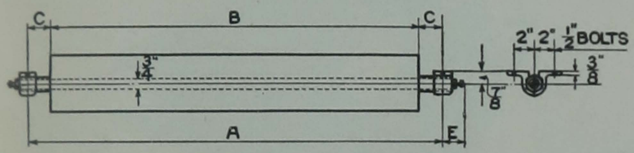
No. S-350—with 5-Inch Diameter Pulley
No. 350—with 6-inch Diameter Pulley

Suitable for use with any roller bearing troughing idler on all moderate or heavy duty conveyors. Exceptionally strong and capable of carrying heavy loads or shocks. The same shaft, pulley and bearing assembly is frequently used as a carrying idler on flat belt conveyors or feeders.

The pulley is made of heavy steel tubing with cast heads forced in. Each pulley head encloses a Shafer roller bearing which is self-aligning so that temporary loads of such weight as to cause slight shaft deflection are carried smoothly without detriment to the idler.

The bearing races are mounted on a solid steel shaft which is supported by clamp boxes bolted to the bottom of the conveyor stringer. Each bearing is protected by a cork washer and labyrinth grease seal and provided with an ample grease chamber fed from a high pressure fitting at the end of the shaft. The bearings are automatically kept in perfect adjustment by coil springs.

Dimensions and Prices

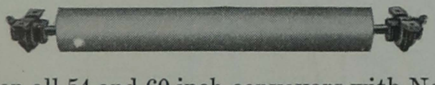


Belt Width In.	5-In. Pulley Each	6-In. Pulley Each	Dimensions, In. A	*A Old Style	B	C	D	Wt. Lbs. 5-In. Pulley	6-In. Pulley
14	$9.90	.....	22	22	17¼	2⅜	2¼	29	..
16	10.30	.....	24	24	19¼	2⅜	2¼	31	..
18	10.70	$12.40	27	30	22¼	2⅜	2¼	33	39
20	11.10	12.80	29	32	24¼	2⅜	2¼	36	41
24	11.80	13.60	33	38	27¼	2⅞	1¾	38	45
30	12.90	14.80	39	44	33¼	2⅞	1¾	43	52
36	14.20	16.20	45	50	39¼	2⅞	1¾	48	58
42	15.60	18.00	51	56	45¼	2⅞	1¾	54	65
48	17.00	19.80	57	62	51¼	2⅞	1¾	60	71

*Similar idlers with a greater dimension A have been furnished in the past and are still available if preferred.

No. 400 Robins Heavy Duty Return Idlers

With 6-Inch Diameter Steel Tube Pulley



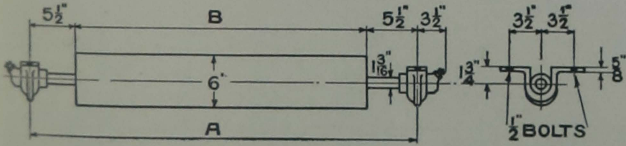
For use on all 54 and 60-inch conveyors with Nos. 253-XR or 215-XR Troughing Idlers.

The pulley of heavy steel tubing has solid welded steel heads set-screwed to a chrome nickel steel shaft of 350 Brinell hardness which turns in Hyatt Roller Bearings.

The hardened steel outer races of the roller bearings are mounted in cast iron housings, supported in self-aligning ball and socket hangers provided with slotted holes for attachment to stringer channels.

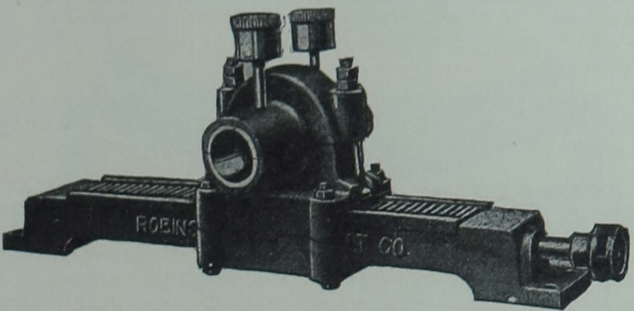
Each bearing housing includes a grease chamber fed through a high pressure fitting and protected by a cork washer and labyrinth grease seal.

Dimensions and Prices



Belt Width In.	Each	Dimensions, Inches A	B	Weight Pounds
54	$31.50	68	57	89
60	32.90	74	63	96

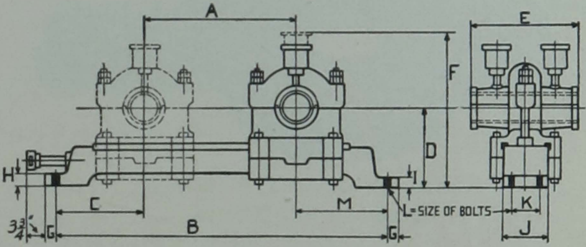
Robins Ball and Socket Protected Screw Take-Ups



This take-up is of heavy design and is strong enough for the heaviest conveyor service. The self-aligning feature is particularly desirable because of the possibility of unequal adjustment.

The babbitted shell shown may be replaced by a Shafer or a Timken roller bearing, and the grease cups may be replaced by high pressure fittings if preferred. The heavy steel adjusting screw, which does not change its length of projection from the base as the take-up is adjusted, is enclosed in the base and protected from dirt or water.

Dimensions and Prices



Shaft Diam., In.	Each	Dimensions, Inches A	B	C	*D	*E	F
1 7/16	$11.13	6	20⅛	7 1/16	5 5/16	6⅛	14
	12.23	12	26⅛	7 1/16	5 5/16	6⅛	14
1 15/16	11.10	6	20⅛	7 1/16	5 13/16	8¼	15½
	11.35	12	26⅛	7 1/16	5 13/16	8¼	15½
	12.45	18	32⅛	7 1/16	5 13/16	8¼	15½
2 7/16	14.18	12	31⅜	9 11/16	7¾	10¼	18⅛
	15.28	18	37⅜	9 11/16	7¾	10¼	18⅛
	17.48	30	49⅜	9 11/16	7¾	10¼	18⅛
2 15/16	17.25	12	31⅜	9 11/16	8¼	11⅞	18¾
	18.90	18	37⅜	9 11/16	8¼	11⅞	18¾
	22.20	30	49⅜	9 11/16	8¼	11⅞	18¾
3 7/16	22.20	18	40½	11⅜	10⅛	14	25½
	27.15	36	58½	11⅜	10⅛	14	25½
	30.45	48	70½	11⅜	10⅛	14	25½
3 15/16	31.99	18	43⅝	12 13/16	11⅜	16¼	26¾
	36.94	36	61⅝	12 13/16	11⅜	16¼	26¾
4 7/16	51.25	36	61⅝	12 13/16	11⅜	16⅞	26¾

Shaft Diam., In.	Dimensions, Inches A	G	H	I	J	K	L	M	Weight Pounds
1 7/16	6	11/16	2½	⅞	3¼	2	½	7 1/16	52
	12	11/16	2½	⅞	3¼	2	½	7 1/16	59
1 15/16	6	11/16	2½	⅞	3¼	2	½	7 1/16	68
	12	11/16	2½	⅞	3¼	2	½	7 1/16	75
	18	11/16	2½	⅞	3¼	2	½	7 1/16	79
2 7/16	12	15/16	1	1	4¾	3	⅝	9 11/16	130
	18	15/16	1	1	4¾	3	⅝	9 11/16	143
	30	15/16	1	1	4¾	3	⅝	9 11/16	164
2 15/16	12	15/16	1	1	4¾	3	⅝	9 11/16	160
	18	15/16	1	1	4¾	3	⅝	9 11/16	170
	30	15/16	1	1	4¾	3	⅝	9 11/16	192
3 7/16	18	1	1¼	1¼	5¾	3¾	¾	11⅛	285
	36	1	1¼	1¼	5¾	3¾	¾	11⅛	330
	48	1	1¼	1¼	5¾	3¾	¾	11⅛	390
3 15/16	18	1 3/16	1 5/16	1 5/16	6¾	4½	⅞	12 13/16	385
	36	1 3/16	1 5/16	1 5/16	6¾	4½	⅞	12 13/16	440
4 7/16	36	1 3/16	1 5/16	1 5/16	6¾	4½	⅞	12 13/16	450

*In the roller bearing take-ups, dimension D is increased about 2 inches and dimension E is decreased to 6 inches in the 1 15/16-inch size, 6½ inches in the 2 7/16-inch size, 7⅜ inches in the 2 15/16-inch size and 7¾ inches in the 3 7/16-inch size.

Robins Automatic Holdbacks

The automatic holdback is a device for preventing the head shaft of a belt conveyor from rotating backward. It is also frequently applied for the same purpose to bucket elevators.

The tendency to rotate backward is present in the head shaft of any conveyor in which the power required for lifting is greater than that required for moving horizontally.

Without a holdback, the running backward of the belt will occur in such a conveyor if the driving power in the head shaft is cut off for any reason while the belt is loaded. This cutting off of power may be due to failure of electric current, burning out of motor, slipping off or breaking of drive belt, breaking of gear or shaft or the working loose of a bearing from its supports, allowing gears to come out of mesh. When a conveyor belt runs backward, much trouble and expense are caused from damage to belts or from congestion and spill of material at foot of incline.

There are 2 standard types of Robins Holdbacks, the Silent Pawl Type and the Roller Type. A heavy-duty type of differential band-brake holdback has also been built, and is available for those preferring this design.

The choice of the type of holdback to use on any conveyor or elevator is largely dependent on the torsional load to be held if the drive fails. The maximum safe torsional loads, in inch pounds, for which the standard sizes of holdbacks are designed, are tabulated below.

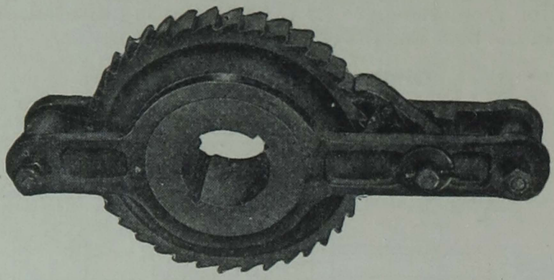
To determine the torsional load in inch pounds to be carried by the holdback, apply the following formula to the conveyor at its normal speed and load:

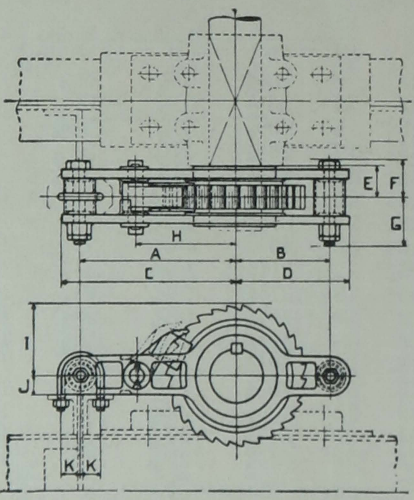
$$\frac{(L—F)\ 33000R}{S} = \text{Torsional load.}$$

L = Horsepower required for lift of material.
F = Horsepower required for horizontal run.
R = Radius of drive pulley in inches.
S = Normal operating speed of belt in feet per minute.

Dimensions and Prices

Silent Pawl Holdbacks



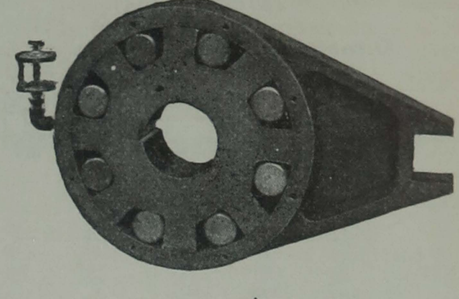


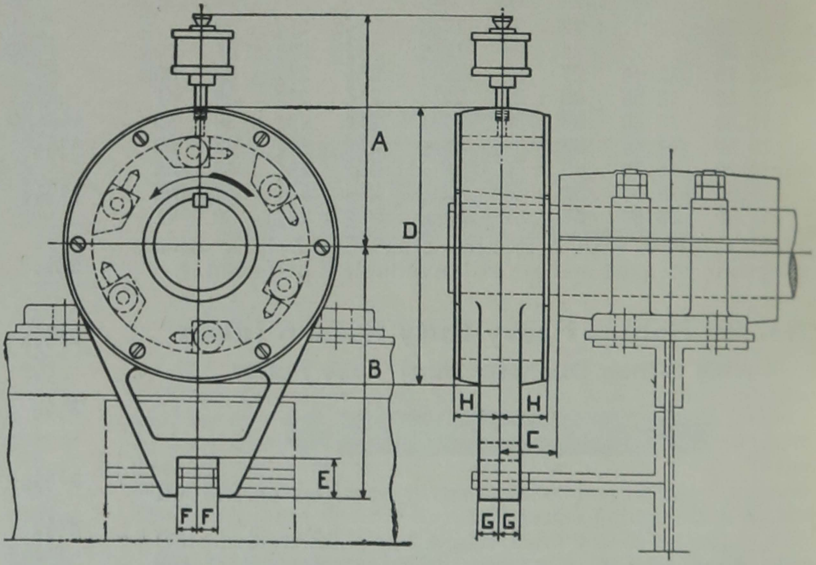
The Silent Pawl Holdback consists of a ratchet wheel keyed to the drive pulley shaft and having a pawl supported in an outer frame centered on the ratchet hub and held against rotation by attachment to the supporting structure. The pawl is held out of contact with the ratchet teeth when the conveyor is running forward, but is instantly brought into action if a backward motion starts. This pawl action is controlled by a simple device consisting of 2 bronze friction plates attached to the pawl and in contact with finished surfaces on the sides of ratchet wheel.

Ratchet Diam. In.	Cast Iron Each	Cast Steel Each	Max. Bore In.	Dimensions, Inches				
				A	B	C	D	E
9	**$42.50**	**$51.00**	3 7/16	10	6	11¼	7¼	1¾
15	**65.00**	**78.00**	5 7/16	14½	9½	16	11	2⅜
21	**103.50**	**132.50**	7	18½	12¾	20¼	14½	2⅞

Ratchet Diam. In.	Dimensions, Inches						Max. Safe Torque In Inch Lbs.		Weight Pounds
	F	G	H	I	J	K	Cast Iron	Cast Steel	
9	2½	3¼	6⅜	4¾	1¼	1⅜	5000	20000	90
15	3	3½	10	7¾	1½	1⅝	16000	65000	200
21	3¾	4¼	13½	10¾	1¾	1⅞	34000	135000	440

Roller Holdbacks



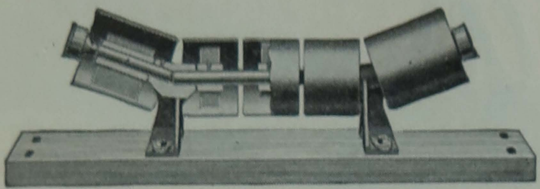


The Roller Holdback consists of a wedge block keyed to the drive shaft and fitted with hardened steel rollers revolving inside a casing which is prevented from rotating by an arm fitting over a lug on the supporting structure.

When the conveyor is running forward, the rollers revolve freely with the wedge block; but if the shaft starts to revolve in the wrong direction, the rollers are instantly jammed between the wedge block and the casing, effectively holding the shaft against any torsional load up to the limits tabulated.

Size In.	Each	Dimensions, Inches								Max. Safe Torque in Inch Lbs.	Wt. Lbs.
		A	B	C	D	E	F	G	H		
9¾	**$99.00**	12	11¼	2¼	12½	1¾	15/16	⅞	2	10000	150
15	**145.00**	15	17½	2¾	18	2½	1¼	1⅛	2½	30000	375
18	**237.50**	17	21	3¼	21¾	3	1½	1⅜	3	50000	750

Dodge Type I Troughing Idlers and Type L Return Idlers



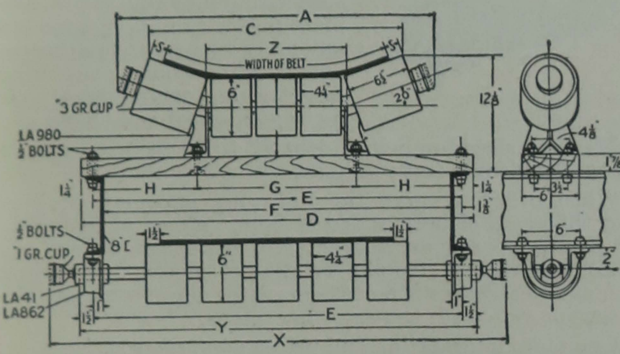
The Type I Idler is fitted for all ordinary classes of service. Parts have been reduced to a minimum and are interchangeable in various sizes of the idlers.

Pulleys are made from patterns especially designed for conveyor work. Faces are ground and edges rounded. Rims are ¼ inch thick after grinding.

Either grease cups or industrial fittings for forced lubrication will be furnished at the same price.

Regularly mounted on hardwood planks, or when specified, will be mounted on a 6-inch steel channel.

Type I Troughing Idlers Mounted on Hardwood Plank Base



Size Belt Inches	Plank Base Each	Plank Base Wt. Lbs.	Channel Base Each	Channel Base Wt. Lbs.	Dimensions, Inches A Grease Cup	C	D	E
14	$13.00	53	$14.00	66	23½	17	28½	26
16	13.00	53	14.00	66	23½	17	28½	26
18	14.80	63	15.80	77	28½	22	32½	30
20	15.00	64	16.00	80	28½	22	36½	34
24	16.50	73	17.50	91	32¾	26¼	40½	38
30	18.20	86	19.20	107	38¾	32¼	46½	44
36	21.20	94	22.70	118	45¼	38¾	52½	50

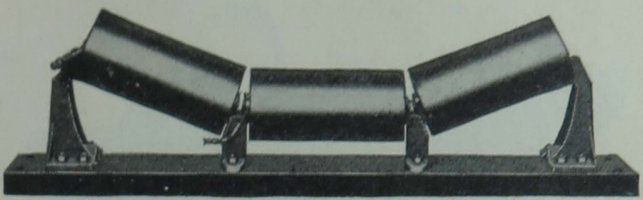
Size Belt Inches	Dimensions, Inches F	G	H	S	Z 1$\frac{3}{16}$-In. Shaft	No. of 6x4¼-In. Pulleys	Area of Load Sq. Ft.
14	23¼	8	9	1⅞	5¼	1	.100
16	23¼	8	9	⅞	5¼	1	.133
18	27¼	12½	8¾	2⅛	9¾	2	.166
20	31¼	12½	10¾	1⅛	9¾	2	.207
24	35¼	17	10½	1¼	14	3	.300
30	41¼	23¼	10⅜	1½	20¼	4	.480
36	47¼	30	10	1¾	27	6	.700

Idlers are regularly furnished with grease cups. Industrial fittings can be supplied when specified. When these are used the A dimension is reduced 2½ inches.

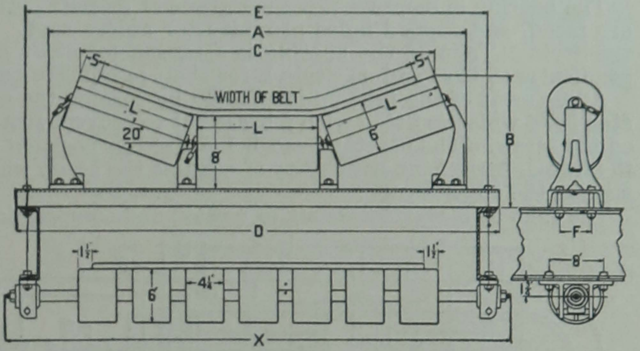
Type L Return Idlers

Belt Size Inches	Each	Weight Pounds	X Maximum Inches Grease Cup	X Maximum Inches Industrial Fitting	Dimensions Inches Y Shaft	E	No. of 6x4¼-in. Pulleys
14	$8.50	47	35½	31¼	1$\frac{3}{16}$x29	26	3
16	8.50	47	35½	31¼	1$\frac{3}{16}$x29	26	3
18	10.00	56	39½	35¼	1$\frac{3}{16}$x33	30	4
20	10.00	57	42¾	39¼	1$\frac{3}{16}$x37	34	4
24	10.30	58	47½	43¼	1$\frac{3}{16}$x41	38	4
30	11.80	68	53½	49¼	1$\frac{3}{16}$x47	44	5
36	13.30	77	59½	55¼	1$\frac{3}{16}$x53	50	6
42	14.80	86	67½	63¼	1$\frac{3}{16}$x61	58	7
48	16.30	96	73½	69¼	1$\frac{3}{16}$x67	64	8

Dodge-Timken Type DTA Troughing Idlers and DTR Return Idlers



Can be furnished for conveyors ranging from 18 to 60 inches wide and mounted either upon channels or angle steel supports. This design insures easy running idlers, with friction reduced to a minimum.



No. DTA Troughing Idlers with Channel Base

Size Belt Inches	Dimensions, Inches A	B	C	D	E
18	27¾	12½	21¼	32½	30
24	33½	13⅛	27	40½	38
30	39¼	13⅞	32¾	46½	44
36	45⅜	14½	38⅞	52½	50
42	51½	15⅜	45	60½	58
48	57⅝	16¼	51	66½	64
54	63¾	17	57¼	72½	70
60	70¼	17¾	63¾	78½	76

Size Belt Inches	Dimensions, Inches L	S	Area of Load Sq. Ft.	Weight Pounds	Price Each
18	7	1⅞	.173	112	$29.80
24	9	1⅞	.307	125	31.00
30	11	1⅞	.480	136	33.00
36	13⅛	2$\frac{1}{16}$	.691	148	36.20
42	15¼	2¼	.941	177	39.40
48	17⅜	2$\frac{7}{16}$	1.23	191	42.60
54	19½	2⅝	1.56	205	45.80
60	21¾	3	1.92	218	49.00

Prices of idlers mounted on anglé base upon application.

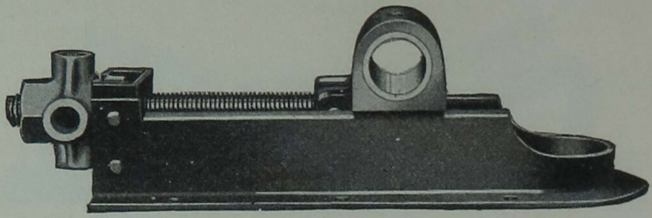
No. DTR Return Idlers

Size Belt In.	Dimen., In. X	Dimen., In. E	No. of Pulleys	Type of Pulley, Inches: 5-Inch Tubular Type DTR-1 Wt. Lbs.	5-Inch Tubular Type DTR-1 Price Each	6-Inch Tubular Type DTR-2 Wt. Lbs.	6-Inch Tubular Type DTR-2 Price Each	6x4¼ Cast Iron Type DTR-3 Wt. Lbs.	6x4¼ Cast Iron Type DTR-3 Price Each
16	31	26	3	35	$10.30	39	$12.00	46	$13.80
18	35	30	4	40	10.70	42	12.40	55	14.20
20	39	34	4	40	11.10	44	12.80	57	14.60
24	43	38	4	42	11.80	47	13.60	59	15.50
30	49	44	5	52	12.90	59	14.80	68	16.90
36	55	50	6	57	14.20	65	16.20	78	18.60
42	63	58	7	62	15.60	70	18.00	87	20.70
48	69	60	8	67	17.00	76	19.80	97	22.80
54	75	70	9	72	18.40	82	21.60	113	24.90
60	81	76	10	77	20.00	88	23.40	120	27.00

When ordering return idlers specify type desired.

Dodge Pressed Steel Frame Take-Ups

Styles A and B



Style B

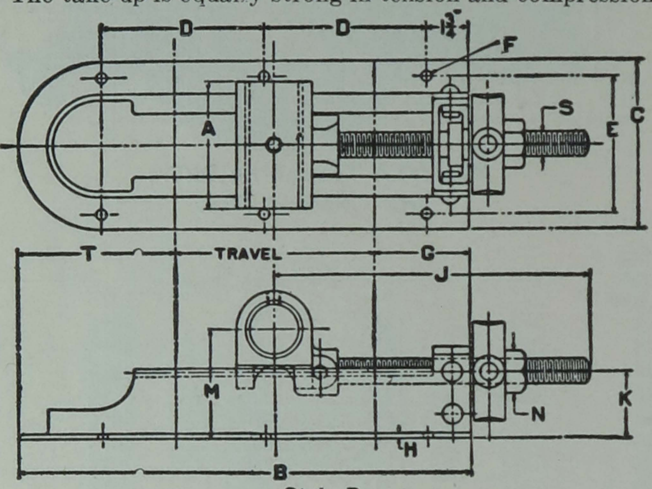
Distinctly new in design, construction and apearance, this take-up marks a striking advance in the take-up field.

The frame is made entirely of rust-resisting copper alloy steel, accurately die formed and capable of withstanding the most severe strains of conveyor and elevator service.

The bearing is lined with a good grade of babbitt. Ends are faced, and tapped holes provided for grease cups. On the Style A Take-up the bearing is arranged for shaft perpendicular to base and on Style B for shaft parallel to base.

Adjustment of the take-up is effected by turning the capstan head which is fitted with a brass nut to prevent rusting on the screw. The capstan head being fixed in position on the frame, there is no possibility of bending the screw when making the adjustment.

The take-up is equally strong in tension and compression.



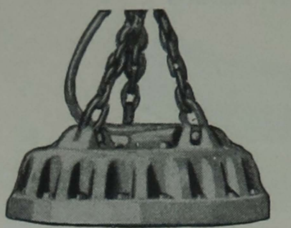
Style B

Price covers one take-up only. Grease cups are not included in price.

Shaft Size Inches	Travel In.	A	B	C	D	E	Bolt F	G	H	J	K
		Dimensions, Inches									
15/16 to 1 3/16	5	3¼	11⅞	4¾	3½	4	5/16	2⅞	⅛	8½	1¾
1 7/16	6	4½	15	5¾	5	4¾	⅜	3½	3/16	10⅛	2⅜
	12	4½	21	5¾	5¼	4¾	⅜	3½	3/16	16⅛	2⅜
1 11/16	6	4½	15	5¾	5	4¾	⅜	3½	3/16	10¼	2⅜
	12	4½	21	5¾	5¼	4¾	⅜	3½	3/16	16¼	2⅜
1 15/16	9	6	20½	6¾	5	5¾	⅜	4¼	¼	14⅛	3⅛
	18	6	29½	6¾	6	5¾	⅜	4¼	¼	23⅛	3⅛
2 3/16	9	6	20½	6¾	5	5¾	⅜	4½	¼	14⅜	3⅛
	18	6	29½	6¾	6	5¾	⅜	4½	¼	23⅜	3⅛
2 7/16	9	6	20½	6¾	5	5¾	⅜	4½	¼	14⅜	3⅛
	18	6	29½	6¾	6	5¾	⅜	4½	¼	23⅜	3⅛

Shaft Size Inches	Travel In.	L	M	N	S	T	No. of Bolts	Grease Cups No.	Net Wt. Lbs.	Price Each
		Dimensions, Inches								
15/16 to 1 3/16	5	3⅜	2¾	1¼	¾	4	6	00	10	**$4.50**
1 7/16	6	4⅝	3⅝	1½	⅞	5½	6	0	16	**5.50**
	12	4⅝	3⅝	1½	⅞	5½	8	0	18	**6.00**
1 11/16	6	4⅝	3⅞	1½	⅞	5½	6	0	16	**5.60**
	12	4⅝	3⅞	1½	⅞	5½	8	0	18	**6.10**
1 15/16	9	6⅛	4⅞	1⅝	1	7¼	8	1	32	**8.00**
	18	6⅛	4⅞	1⅝	1	7¼	10	1	40	**9.25**
2 3/16	9	6⅛	5⅛	1⅝	1	7	8	1	34	**8.25**
	18	6⅛	5⅛	1⅝	1	7	10	1	42	**9.50**
2 7/16	9	6⅛	5⅛	1⅝	1	7	8	1	34	**8.50**
	18	6⅛	5⅛	1⅝	1	7	10	1	42	**9.75**

C-H Stationary Separator Magnets

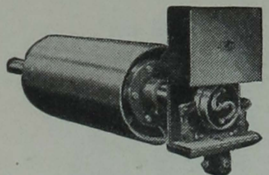


The most efficient location for a stationary separator magnet is at the discharge end of a conveyor. At this point, the material falls freely from the conveyor and the magnetic material is most easily extracted. Separator magnets may also be mounted over troughed or flat belt conveyors, over chutes or inverted so that the face of the magnet forms a part of the bottom of the chute.

The coil shield is flat and flush with the magnet pole making the entire face of the magnet a smooth surface and preventing large and irregularly shaped pieces of material which do not lift clear of the belt, from lodging between the belt and projections on the magnet face.

Complete information and prices upon request.

Type W C-H Magnetic Separator Pulleys



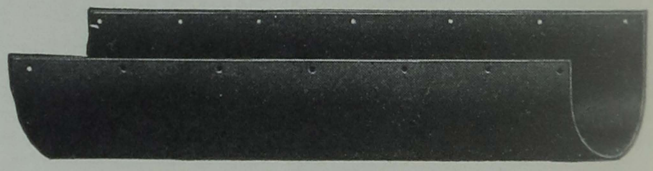
Coil shield is attached to end poles by continuous weld. Has dust-proof collector ring enclosure with removable cover. Complete pulley is impregnated after assembly with impregnating compound. Wire wound coils, wound directly on center core. One-piece solid steel coil shield.

Made in sizes for belt widths 12 to 60 inches, capacities up to 31200 cubic feet per hour.

When ordering, give the following information: Width and thickness of belt; speed of belt; volume of material to be handled per hour; character of non-magnetic and magnetic material, maximum weights of pieces; d.c. voltage; a.c. characteristics if motor generator set is required; shaft extension required; keyseat dimensions.

Complete information and prices upon request.

Link-Belt Plain Steel Linings for Wood Troughs



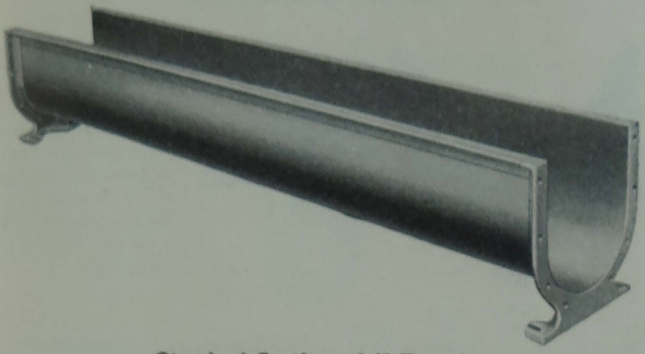
Made in standard lengths of 30 inches.

In mounting, the lining is fastened along the top edges by screws or nails driven into the trough sides. It is supported at the joints by curved wooden cleats.

Diam. Conveyor In.	Standard Weight Ga. of Steel	Standard Weight Per Lin. Ft.	Heavy Gages Per Lineal Foot Gage of Steel 18	16	14	12	10	3/16"
4	22	**$.12**	**$.20**	**$.24**	....	....	....	....
6	22	**.16**	**.26**	**.32**	**$.38**	....	....	....
9	20	**.24**	....	**.42**	**.52**	**$.74**	**1.00**	....
10	20	**.26**	....	**.46**	**.58**	**.82**	**1.10**	....
12	20	**.30**	....	**.52**	**.70**	**1.00**	**1.30**	**$1.70**
14	18	**.50**	....	**.66**	**.86**	**1.20**	**1.60**	**2.10**
16	18	**.60**	....	**.80**	**1.00**	**1.40**	**1.90**	**2.50**
18	18	**.80**	....	**1.00**	**1.20**	**1.70**	**2.30**	**3.00**

Diam. Conveyor In.	Width Sheet In.	Width of Box In.	Height of Box In.	Diam. Conveyor In.	Width Sheet In.	Width of Box In.	Height of Box In.
4	8	5	6	**12**	24	13	15⅞
6	12	7	8	**14**	28	15	17⅜
9	18	10	11½	**16**	32	17	19⅞
10	20	11	12¾	**18**	36	19	21⅞

Link-Belt Steel Troughs, Flanges and Joints



Standard Section of U-Trough

Trough can be furnished with the following types of joints: Butt strap joint, cast iron flanges without feet and cast iron flanges with feet, and with bolted or clamp type covers, dust tight covers or hip roof covers.

Standard sizes of steel U-trough from 6 to 16 inches, inclusive, are assembled with malleable iron end flanges, welded to trough sheets. Malleable iron flanges are practically unbreakable in transit, erection or service. These flanges can be furnished with or without feet.

The welded joint between flange and trough sheet is dust-tight, and very secure. Flanges are squared-up in special fixtures while welding, to assure correct matching of end flange bolt holes and proper alignment of assembled trough.

Angle type trough with malleable iron flange connections will be furnished unless otherwise specified. Covers not included unless ordered. Covers when furnished will be screw clamp unless otherwise specified. Indicate style of cover fastening preferred.

List prices do not include intake or discharge openings.

Trough Only

		Angle Type				Flanged Type		
Diam. Conveyor In.	Thickness Steel In.	Butt Strap Connections Per Foot	Mall. Iron Flange Connections Per Foot	Wt. Lbs. Per Foot	Size Angles In.	Butt Strap Connections Per Foot	Mall. Iron Flange Connections Per Foot	Wt. Lbs. Per Foot
4	*18	$2.10	$2.30	4.7	1 x1 x⅛	....	....	....
4	16	2.15	2.35	5.3	1 x1 x⅛	....	....	....
4	14	2.30	2.50	6.0	1 x1 x⅛	....	....	....
4	12	2.60	2.80	7.6	1 x1 x⅛	....	....	....
4	10	3.10	3.30	9.1	1 x1 x⅛	....	....	....
6	*16	2.30	2.55	7.9	1¼x1¼x3/16	....	....	....
6	14	2.65	2.90	8.9	1¼x1¼x3/16	....	....	....
6	12	3.00	3.25	11.0	1¼x1¼x3/16	$2.30	$2.55	9.4
6	10	3.50	3.75	13.0	1¼x1¼x3/16	2.80	3.05	11.8
6	3/16	4.10	4.35	16.1	1¼x1¼x3/16	3.40	3.65	15.5
9	16	2.90	3.35	11.2	1½x1½x3/16	....	....	....
9	*14	3.15	3.60	12.6	1½x1½x3/16	....	....	....
9	12	3.65	4.10	15.5	1½x1½x3/16	2.85	3.30	13.6
9	10	4.20	4.65	18.4	1½x1½x3/16	3.40	3.85	17.0
9	3/16	5.15	5.60	22.8	1½x1½x3/16	4.35	4.80	22.0
9	¼	5.90	6.35	28.5	1½x1½x3/16	5.10	5.55	28.8
10	16	3.30	3.80	11.8	1½x1½x3/16	....	....	....
10	*14	3.55	4.05	13.3	1½x1½x3/16	....	....	....
10	12	3.95	4.45	16.5	1½x1½x3/16	3.15	3.65	14.6
10	10	4.45	4.95	19.5	1½x1½x3/16	3.65	4.15	18.1
10	3/16	5.50	6.00	24.2	1½x1½x3/16	4.70	5.20	23.5
10	¼	6.70	7.20	30.4	1½x1½x3/16	5.90	6.40	30.8
12	14	3.90	4.50	17.6	2 x2 x3/16	....	....	....

*Standard; furnished unless otherwise specified.

Link-Belt Steel Troughs, Flanges and Joints

Trough Only

Continued

		Angle Type			Flanged Type			
Diam. Conveyor In.	Thickness Steel In.	Butt Strap Connections Per Foot	Mall. Iron Flange Connections Per Foot	Wt. Lbs. Per Foot	Butt Strap Connections Per Foot	Mall. Iron Flange Connections Per Foot	Wt. Lbs. Per Foot	Size Angles In.
12	*12	$4.55	$5.15	21.3	$3.55	$4.05	18.8	2 x2 x3/16
12	10	5.05	5.65	25.0	4.05	4.65	23.1	2 x2 x3/16
12	3/16	6.05	6.65	30.6	5.05	5.65	29.8	2 x2 x3/16
12	¼	7.35	7.95	38.1	6.35	6.95	38.5	2 x2 x3/16
14	14	4.65	5.45	20.2	....	....	....	2 x2 x3/16
14	*12	5.25	6.05	24.5	....	....	....	2 x2 x3/16
14	10	5.80	6.60	28.9	4.55	5.35	27.1	2 x2 x3/16
14	3/16	6.85	7.65	35.4	5.60	6.40	34.7	2 x2 x3/16
14	¼	8.15	8.95	44.1	6.90	7.70	44.8	2 x2 x3/16
16	14	5.25	6.50	22.7	....	....	....	2 x2 x3/16
16	*12	5.85	7.10	27.7	....	....	....	2 x2 x3/16
16	10	6.50	7.75	32.7	5.00	6.25	31.1	2 x2 x3/16
16	3/16	7.60	8.85	40.1	6.10	7.35	39.6	2 x2 x3/16
16	¼	8.90	10.15	50.1	7.40	8.65	51.1	2 x2 x3/16
18	12	7.40	8.80	32.6	....	....	....	2½x2½x¼
18	*10	8.15	9.55	38.2	....	....	....	2½x2½x¼
18	3/16	9.60	11.00	46.6	7.85	9.25	43.6	2½x2½x¼
18	¼	11.20	12.60	57.8	9.45	10.85	56.6	2½x2½x¼
20	12	8.50	10.30	36.2	....	....	....	2½x2½x¼
20	*10	9.30	11.10	42.4	....	....	....	2½x2½x¼
20	3/16	10.90	12.70	51.7	8.90	10.70	49.0	2½x2½x¼
20	¼	13.00	14.80	64.2	11.00	12.80	63.2	2½x2½x¼

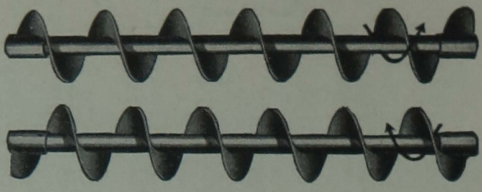
Cover Only

Diam. Conveyor Inches	Thickness Steel Cover Inches	Thickness Steel Trough Inches	Bolted Cover Mall. Iron or Spring Clamp Per Foot	Extra for Dust Seal Construction Per Foot	Extra for Commercial Dust Tight Construction Per Foot	Weight Pounds Per Foot
4	*20	*18	$.70	$1.25	$.40	1.0
4	18	16	.75	1.25	.40	1.3
4	16	14	.80	1.25	.40	1.6
4	16	12	.80	1.25	.40	1.6
4	16	10	.80	1.25	.40	1.6
6	*18	*16	.85	1.25	.40	2.0
6	16	14	.90	1.25	.40	2.5
6	14	12	.95	1.25	.40	3.3
6	14	10	.95	1.25	.40	3.3
6	14	3/16	.95	1.25	.40	3.3
9	18	16	.90	1.50	.50	2.5
9	*16	*14	1.00	1.50	.50	3.0
9	14	12	1.10	1.50	.50	3.9
9	14	10	1.10	1.50	.50	3.9
9	14	3/16	1.10	1.50	.50	3.9
9	14	¼	1.10	1.50	.50	3.9
10	18	16	1.00	1.50	.50	3.0
10	*16	*14	1.10	1.50	.50	3.4
10	14	12	1.20	1.50	.50	4.2
10	14	10	1.20	1.50	.50	4.2
10	14	3/16	1.20	1.50	.50	4.2
10	14	¼	1.20	1.50	.50	4.2
12	16	14	1.25	2.00	.60	4.2
12	*14	*12	1.35	2.00	.60	5.3
12	14	10	1.35	2.00	.60	5.3
12	14	3/16	1.35	2.00	.60	5.3
12	14	¼	1.35	2.00	.60	5.3
14	16	14	1.40	2.00	.70	4.5
14	*14	*12	1.55	2.00	.70	5.6
14	14	10	1.55	2.00	.70	5.6
14	14	3/16	1.55	2.00	.70	5.6
14	14	¼	1.55	2.00	.70	5.6
16	16	14	1.55	2.00	.80	5.3
16	*14	*12	1.70	2.00	.80	6.4
16	14	10	1.70	2.00	.80	6.4
16	14	3/16	1.70	2.00	.80	6.4
16	14	¼	1.70	2.00	.80	6.4
18	14	12	1.80	2.50	.90	7.0
18	*14	*10	1.80	2.50	.90	7.0
18	12	3/16	2.00	2.50	.90	9.7
18	12	¼	2.00	2.50	.90	9.7
20	14	12	2.00	2.50	1.00	7.5
20	*14	*10	2.00	2.50	1.00	7.5
20	12	3/16	2.20	2.50	1.00	10.5
20	12	¼	2.20	2.50	1.00	10.5

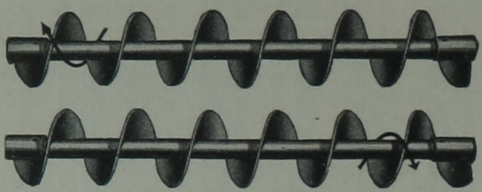
*Standard; furnished unless otherwise specified.

Standard Spiral Steel Conveyors

Right-Hand Conveyors



Left-Hand Conveyors



State whether right or left-hand is required.

Prices are for bare conveyor only and do not include hangers, lining, couplings or coupling bolts. Required fittings should be selected and specified in each order for conveyor and will be billed at regular prices.

Coupling bolts are furnished without extra charge when couplings are ordered with each length of conveyor.

Price of a standard length of conveyor is based on a nominal length for each diameter, as indicated in table, which includes the width of one hanger space, and not the exact length.

*Nominal Diameter Inches Conveyor	Pipe Inside	Coupling	Thick. Flight Gage No.	Std. Lgth. Ctr. to Ctr. of Bearings	Wt. Lbs. per 100 Ft.	Bare Conveyor per Foot
4	1	1	18	8	250	**$1.70**
6	1½	1½	16	10	450	**2.00**
9	1½	1½	14	10	550	**2.30**
9	2	2	14	10	650	**2.60**
10	1½	1½	14	10	600	**2.50**
10	2	2	14	10	700	**2.70**
12	2	2	12	12	850	**2.70**
12	2½	2⁷⁄₁₆	12	12	1050	**3.20**
12	3	3	12	12	1250	**3.70**
14	2½	2⁷⁄₁₆	12	12	1250	**3.80**
14	3	3	12	12	1400	**4.20**
16	3	3	10	12	1600	**4.70**
18	3	3	10	12	1650	**5.50**
20	4	3	⅜ In.	12	4000	**10.00**

Extras for Longer or Shorter Lengths

Sections shorter or longer than standard should be specified exact lengths end to end of pipe and the length used in pricing will be that of next higher 6 inches; i.e. 6 feet 1 inch will be priced as 6 feet 6 inches—6 feet 11 inches as 7 feet.

Shorter than standard lengths of conveyor whether single lengths or a part of a line, which includes standard lengths, are subject to an extra charge on a percentage basis: Following are the extra percentages for shorter than standard lengths (duplicate sections):

No. of Pieces	1 or 2	3 to 5	6 to 10
2 Feet Long or Less	75%	50%	25%
Over 2 and Not Exceeding 5 Feet in Length	50%	30%	15%
Over 5 and Not Exceeding 8 Feet in Length	25%	15%	10%
Over 8 Feet and Less Than Standard Length	15%	10%	5%

Extras for shorter lengths, 11 pieces or more, percentages upon application.

Lengths longer than standard will be charged at the following extra percentages:

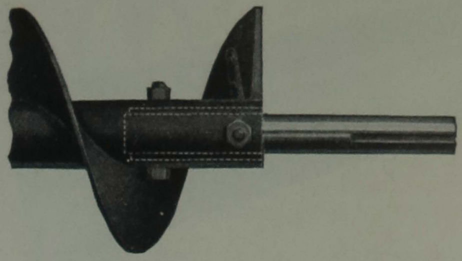
Not Exceeding 2 Feet Longer Than Standard	10%
Over 2 and Not Exceeding 6 Feet Longer than Standard Lengths	15%
Exceeding 6 Feet Longer than Standard Lengths and Not Longer than 20 Feet	25%

Extra percentages for pieces over 20 feet upon application.

An extra charge will be made for boxing or crating if necessary on longer than standard lengths.

*Where exact diameters are required or centering for straight and accurate operation an extra charge will be made.

Link-Belt Standard Drive Ends for Screw Conveyors



Projection of drive and end shafts is measured from end of pipe and not from outside of trough end bearing. Space must be allowed for end bearing.

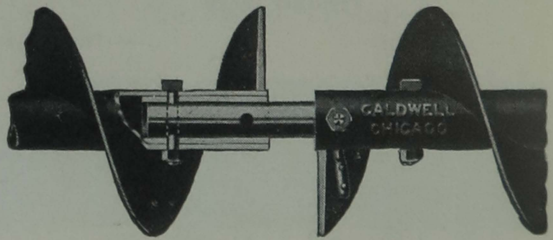
Diam. Drive End Shaft In.	End of Pipe to Center of Hole In.	Center to Center of Holes In.	Diam. Coupling Bolts In.	*Keyseat In.	Standard Projection Max. In.	Each	Wt. Lbs.
1	½	2	⅜	¼x⅛	7	**$.60**	3
1½	⅞	3	½	⅜x³⁄₁₆	9	**1.20**	7
2	⅞	3	⅝	½x¼	10	**2.20**	13
2⁷⁄₁₆	¹⁵⁄₁₆	3	⅝	⅝x⁵⁄₁₆	12	**3.00**	22
3	1	3	¾	¾x⅜	13	**4.70**	38
3⁷⁄₁₆	1½	4	⅞	⅞x⁷⁄₁₆	15	**9.00**	66

Diam. Drive End Shaft In.	Special Projection 18-Inch Each	Wt. Lbs.	24-Inch Each	Wt. Lbs.	30-Inch Each	Wt. Lbs.	36-Inch Each	Wt. Lbs.
1	**$.80**	5	**$.90**	7	**$1.00**	8	**$1.10**	9
1½	**1.50**	11	**1.70**	15	**1.90**	18	**2.10**	21
2	**2.70**	20	**3.10**	26	**3.50**	31	**3.90**	36
2⁷⁄₁₆	**3.60**	30	**4.20**	38	**4.80**	46	**5.40**	54
3	**5.60**	46	**6.50**	58	**7.40**	70	**8.30**	82
3⁷⁄₁₆	....	..	**10.20**	82	**11.40**	97	**12.60**	112

In ordering, specify length wanted.

*Keyseats cut only when ordered and charged for at regular prices. Give length and location from outer end of shaft. Prices do not include bolts unless conveyor is ordered.

Link Belt Screw Conveyor Couplings

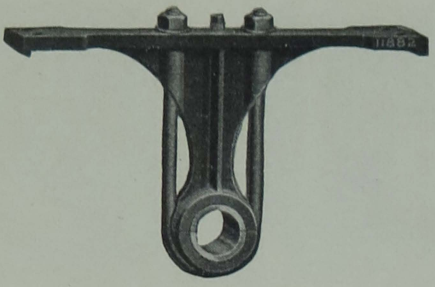


By using internal collars, the couplings for helicoid conveyor are arranged to be of the same diameter as for sectional flight conveyor of corresponding size and interchangeable. Prices do not include bolts.

Diameter Coupling...in.	**1**	**1½**	**2**	**2⁷⁄₁₆**	**3**	**3⁷⁄₁₆**
Each	**$.40**	**.90**	**1.60**	**2.30**	**3.50**	**7.00**
Coupling Bolts.......in.	⅜	½	⅝	⅝	¾	⅞
Weight.............lbs.	1.5	5.6	9.8	15.4	23.8	44.5

We Stock a Complete Line of
Power Transmission
Prompt Action in Emergencies

No. 17 Link Belt Conveyor Hangers for Wood Troughs

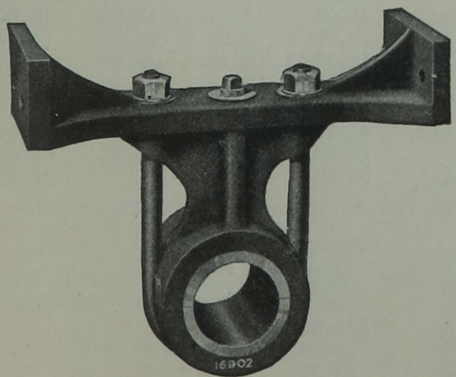


The No. 17 hanger has a steel U bolt supporting the bearing. The bearing is split and babbitted. An oil hole is provided from the top of the hanger to the bearing.

Diam. Conveyor In.	Bearing Bore In.	Each	Bearing Lgth. In.	Center Bearing to Supports In.	Center to Center of Bolt Holes, Inches Lgth.	Center to Center of Bolt Holes, Inches Width	Thickness Base In.	Wt. Lbs.
4	1	$2.20	1½	3⅛	5¾	1	⅜	3
6	1½	2.70	2	4⅛	7¾	1¼	⅜	5
9	1½	3.00	2	6	11½	1¾	7/16	10
9	2	3.80	2	6	11	1¾	⅜	13
10	1½	4.00	2	7	12½	2	⅜	14
10	2	4.50	2	7	12½	1¾	½	15
12	2	4.70	2	8⅝	15	1¾	½	17
12	2 7/16	6.00	3	8⅝	15	1¾	½	22
12	3	7.00	3	8⅝	15	1¾	½	24
14	2 7/16	7.00	3	9¼	17	1¾	½	28
14	3	8.50	3	9¼	17	1¾	½	29
16	3	9.00	3	10½	19	2½	½	31
18	3	10.50	3	11⅞	20⅞	2½	½	35
20	3	12.00	3	11⅞	22⅝	2½	⅝	39

No. 18 Link Belt Conveyor Hangers for Wood or Steel Troughs

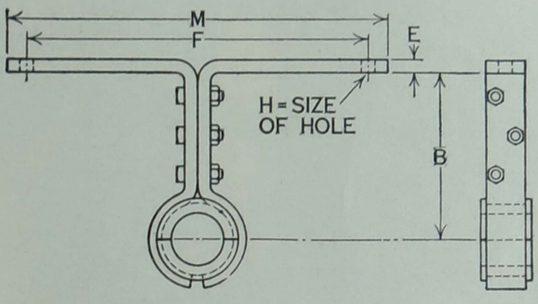
Babbitted



Diam. of Conveyor In.	Bearing Bore In.	Each	Bearing Length In.	Inside Width Box In.	Drop Hanger In.	Wt. Lbs.
4	1	$2.20	1½	5	3½	3
6	1½	2.70	2	7	4⅜	5
9	1½	3.00	2	10	6	9
9	2	3.80	2	10	6	10
10	1½	4.00	2	11	6¼	10
10	2	4.50	2	11	6¼	10
12	2	4.70	2	13	7⅝	14
12	2 7/16	6.00	3	13	7⅝	17
12	3	7.00	3	13	7⅝	21
14	2 7/16	7.00	3	15	9	27
14	3	8.50	3	15	9	28
16	3	9.00	3	17	10⅝	30
18	3	10.50	3	19	11⅞	35

No. 20A Link-Belt Hangers

For Wood or Steel Troughs



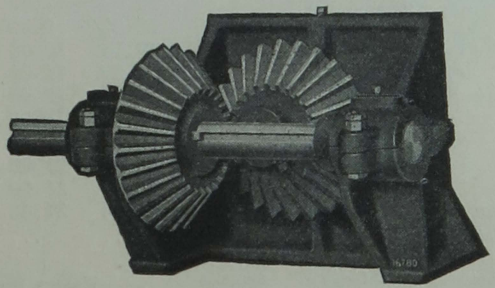
White Iron bearings are standard and will be furnished unless otherwise specified. Babbitted bearings can also be furnished. Prices on application.

Oil pipes will be furnished only with babbitted bearing hangers unless otherwise specified. The ⅛-inch oil pipe is standard. Prices on application.

Conveyor Diam. In.	Each	Bearing Bore In.	Bearing Length In.	Dimensions, In. For Steel Troughs B	F	H	M	For Wood Troughs B	F	H	M	E	Wt. Lbs. Each
4	$5.00	1	1½	3⅝	6½	7/16	7¼	3¼	5⅞	7/16	6¾	¼	4
6	5.50	1½	2	4½	8¾	9/16	9¾	4 3/16	7⅞	7/16	8¾	5/16	5
9	6.50	1½	2	6⅛	12¼	9/16	13½	6⅛	11¼	9/16	12½	⅜	7
9	7.00	2	2	6⅛	12¼	9/16	13½	6	11¼	9/16	12½	½	8
10	7.00	1½	2	6⅜	13¼	9/16	14½	6¾	12¼	9/16	13½	½	9
10	8.00	2	2	6⅜	13¼	9/16	14½	6¾	12¼	9/16	13½	½	12
12	8.50	2	2	7¾	15¾	11/16	17½	8⅞	14⅝	11/16	16¼	½	13
12	9.00	2 7/16	3	7¾	15¾	11/16	17½	8⅞	14⅝	11/16	16¼	½	17
12	10.00	3	3	7¾	15¾	11/16	17½	8⅞	14⅝	11/16	16¼	½	18
14	11.00	2 7/16	3	9¼	17¾	11/16	19½	9⅜	16⅝	11/16	18¼	½	18
14	12.00	3	3	9¼	17¾	11/16	19½	9⅜	16⅝	11/16	18¼	½	21
16	14.00	3	3	10⅝	19¾	11/16	21½	10¾	18⅝	11/16	20¼	⅝	28
18	16.00	3	3	12⅛	22¼	13/16	24½	11¾	20⅝	11/16	22¼	⅝	34
20	20.00	3	3	13½	24¼	13/16	26½	11⅞	22⅝	11/16	24¼	¾	40

Link-Belt Extra Heavy Countershaft Ends

For Wood or Steel Troughs With Miter or Bevel Gears



These countershaft ends may be adapted to steel trough by use of separate flange castings. In ordering, state whether wanted for wood or steel trough.

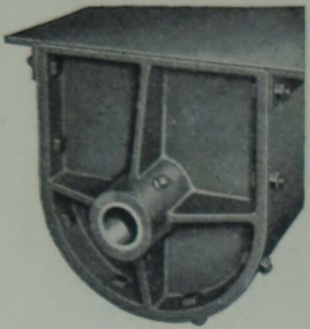
Cast iron cast tooth miter gears will be furnished unless otherwise specified.

No deduction is allowed for the omission of either or both shafts.

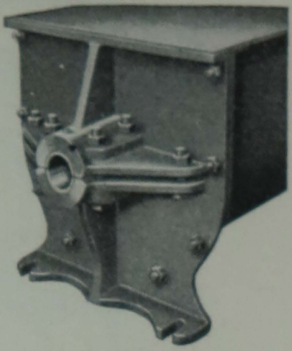
Diameter Conveyor Inches	Diameter Drive End Shaft Inches	Diameter Countershaft Inches	*Each	Weight Pounds
9	2	2	$85.00	230
12	2	2	115.00	455
12	2 7/16	2 7/16	125.00	475
12	3	3	140.00	500
14	2 7/16	2 7/16	160.00	630
14	3	2 7/16	175.00	650
14	3	3	175.00	680
16	3	2 7/16	190.00	730
16	3	3	190.00	765

*Price includes either miter or 2 to 1 ratio cast iron cast tooth bevel gears.

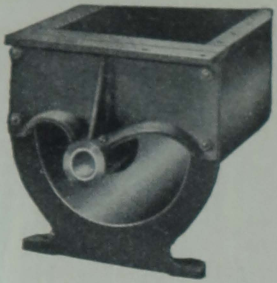
Link-Belt Cast Iron Ends for Steel Conveyor Troughs



Inside Pattern, without Feet



Outside Pattern Split



Outside Pattern Discharge End

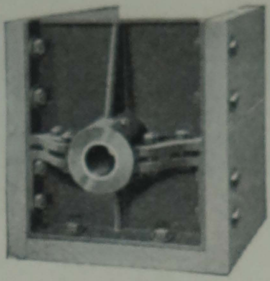
Diam. Conveyor In.	Bearing Bore In.	Solid Ends: Inside Pattern Each	Solid Ends: Outside Pattern With Feet Each	Solid Ends: Outside Pattern Without Feet Each	Split Type Outside Pattern with Feet Each	Discharge Ends: Inside Pattern Each	Discharge Ends: Outside Pattern Each
4	1	$3.00	$3.60	$3.30	$9.30	$2.70	$3.00
6	1½	4.00	4.80	4.40	10.40	3.60	4.00
9	1½	5.50	6.60	6.00	11.60	5.00	5.50
9	2	6.50	7.80	7.20	12.60	6.00	6.50
10	1½	7.00	8.40	7.70	14.70	6.50	7.00
10	2	8.00	9.60	8.80	15.80	7.00	8.00
12	2	10.00	12.00	11.00	19.00	9.00	10.00
12	2 7/16	11.00	13.20	12.10	20.10	10.00	11.00
12	3	12.00	14.40	13.20	21.20	11.00	12.00
14	2 7/16	14.00	16.80	15.40	27.40	12.50	14.00
14	3	16.00	19.20	17.60	28.60	14.50	16.00
16	3	19.00	22.80	21.00	36.80	17.00	19.00
18	3	23.00	27.60	25.20	47.40	21.00	23.00
20	3	28.00	33.60	30.80	52.80	25.00	.....
20	3 7/16	34.00	40.80	37.60	58.00	31.00	.....
24	3 7/16	40.00	48.00	44.00	.....	.....	.....

Diam. Conveyor In.	Bearing Bore In.	*†Marine Thrust End Each	*Stuffing Gland End Each	Weight, Pounds: Inside Pattern	Weight, Pounds: Outside Pattern	Weight, Pounds: Discharge End
4	1	$35.00	$24.00	8	9	7
6	1½	38.00	26.00	15	17	12
9	1½	43.00	31.00	23	30	22
9	2	48.00	36.00	25	35	24
10	1½	46.00	34.00	30	40	27
10	2	52.00	40.00	34	43	29
12	2	55.00	43.00	44	55	40
12	2 7/16	61.00	50.00	45	60	45
12	3	70.00	60.00	51	66	50
14	2 7/16	68.00	57.00	68	90	53
14	3	78.00	68.00	70	95	55
16	3	89.00	78.00	100	120	78
18	3	102.00	92.00	105	130	85
20	3	115.00	103.00	138	160	110
20	3 7/16	135.00	125.00	150	172	115
24	3 7/16	150.00	140.00	240	265	...

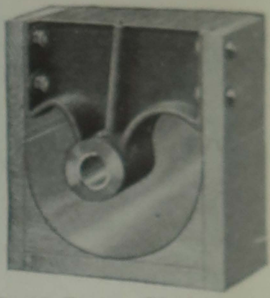
*Inside or outside pattern, with or without feet.

†Price includes grooved shaft, with standard keyseated drive end projection.

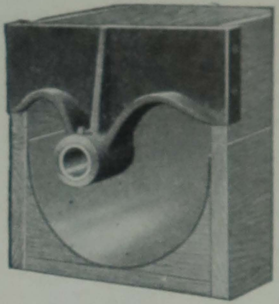
Link-Belt Cast Iron Ends for Wood Conveyor Troughs



Inside Pattern, Split



Inside Pattern Discharge End



Outside Pattern Discharge End

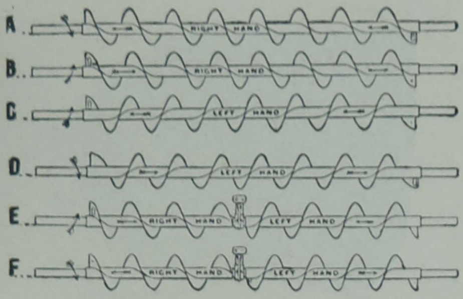
Diam. Conveyor In.	Bearing Bore In.	Solid Ends: Inside Pattern Each	Solid Ends: Outside Pattern Each	Split Type Inside Pattern Each	Discharge Ends: Inside Pattern Each	Discharge Ends: Outside Pattern Each
4	1	$3.00	$3.30	$9.00	$2.70	$3.00
6	1½	4.00	4.40	10.00	3.60	4.00
9	1½	5.50	6.00	11.00	5.00	5.50
9	2	6.50	7.20	12.00	6.00	6.50
10	1½	7.00	7.70	14.00	6.50	7.00
10	2	8.00	8.80	15.00	7.00	8.00
12	2	10.00	11.00	18.00	9.00	10.00
12	2 7/16	11.00	12.10	19.00	10.00	11.00
12	3	12.00	13.20	20.00	11.00	12.00
14	2 7/16	14.00	15.40	26.00	12.50	14.00
14	3	16.00	17.60	27.00	14.50	16.00
16	3	19.00	21.00	35.00	17.00	19.00
18	3	23.00	25.20	45.00	21.00	23.00
20	3	28.00	30.80	50.00	25.00	28.00
20	3 7/16	34.00	37.60	.....	31.00	34.00

Diam. Conveyor In.	Bearing Bore In.	*†Marine Thrust End Each	*Stuffing Gland End Each	Weight, Pounds: Inside Pattern	Weight, Pounds: Outside Pattern	Weight, Pounds: Discharge End
4	1	$35.00	$24.00	9	11	8
6	1½	38.00	36.00	16	19	14
9	1½	43.00	31.00	30	32	20
9	2	48.00	36.00	31	33	22
10	1½	46.00	34.00	36	37	29
10	2	52.00	40.00	37	38	30
12	2	55.00	43.00	51	56	40
12	2 7/16	61.00	50.00	57	60	41
12	3	70.00	60.00	62	65	42
14	2 7/16	68.00	57.00	78	81	48
14	3	78.00	68.00	79	82	50
16	3	89.00	78.00	100	102	60
18	3	102.00	92.00	116	130	72
20	3	115.00	103.00	125	140	80
20	3 7/16	135.00	125.00	130	145	85

*Inside or outside pattern.

†Price includes grooved shaft, with standard keyseated drive end projection.

Information to Be Given When Ordering Conveyors



In making out orders for conveyor, please be sure to cover the following points:

1. Outside diameter of conveyor?

*2. What is total length of conveyor?

3. Unless otherwise specified, we will furnish standard lengths, where possible, making a special length if necessary, to complete the total length. If special lengths are required throughout, be sure to specify.

4. Do you require Helicoid or Sectional flight conveyor? Helicoid conveyor always furnished, where possible, unless otherwise specified.

5. State gauge of flights required.

6. State size of pipe required.

7. Is conveyor right-hand or left-hand? See diagrams above and mention letter showing your conditions.

8. Are linings required?

9. Are hangers wanted?

10. If hangers are wanted, what style?

11. Are couplings wanted?

12. Are drive ends wanted?

13. If drive ends are wanted, give diameter and projections from pipe.

14. If different from standard tail end is required, give diameter and projection.

15. Are any box ends wanted? What style? For wood or steel box?

16. Is any steel conveyor box wanted? If so, state gauge, size and location of openings.

17. Is any cover wanted on steel conveyor box?

18. Any outside bearings wanted?

19. How many?

20. What size?

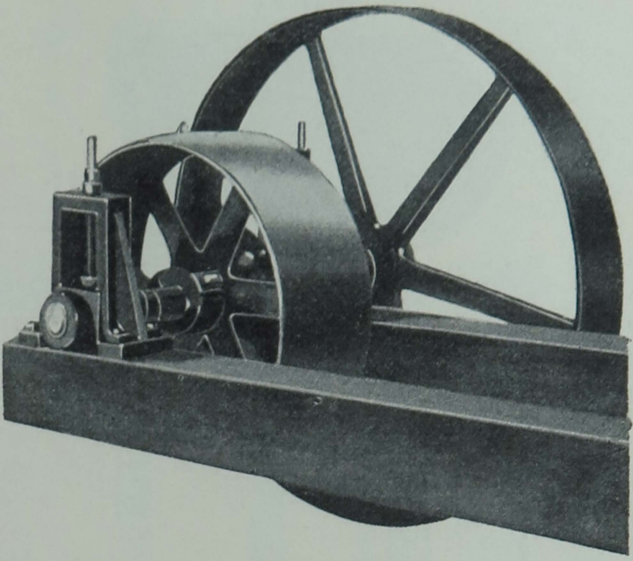
21. What kind?

In ordering counter shaft box ends, right angle drives, end thrust box ends, box supports, discharge gates, couplings, flights, bolts, or other special features, or repairs, refer to lists and give as full particulars as possible.

*Each standard length includes width of one hanger bearing.

For any odd length required, specify exact length of pipe; otherwise we would deduct width of hanger bearing from total length given.

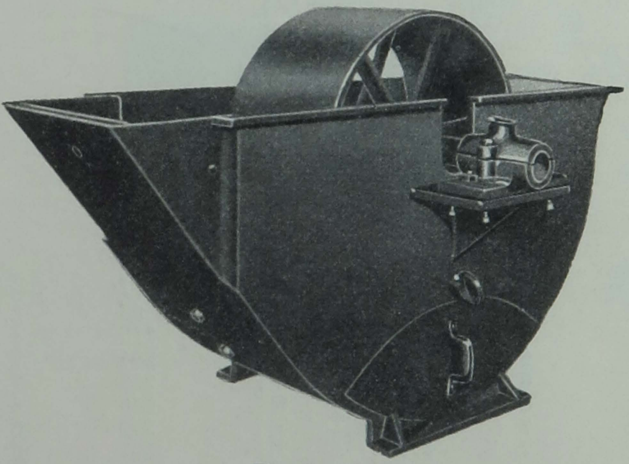
Cast Iron Elevator Heads and Boots



Elevator Head

Designed especially for handling ores, crushed rock, sand, gravel, etc. Extra heavy take-ups are in the head. This is of special advantage, especially in the handling of ores.

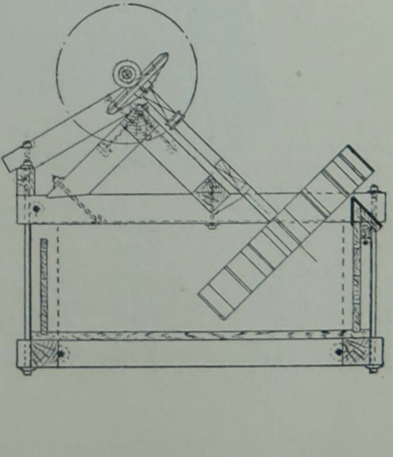
The elevator boot is made with cast iron sides and heavy plate bottom, with side doors or drop bottom for cleaning. It has dust-proof, rigid bearings.



Elevator Boot

Lgth. of Bucket In.	Size Head and Boot Pulley In.	Size Drive Pulley In.	Wt., Lbs.		Lgth. of Bucket In.	Size Head and Boot Pulley In.	Size Drive Pulley In.	Wt., Lbs.	
			Head	Boot				Head	Boot
4	24x5	36x4	350	450	**14**	30x15	60x8	800	1000
6	24x7	36x6	450	550	**16**	30x17	66x8	900	1100
8	30x9	48x6	650	800	**18**	30x19	72x8	1000	1250
10	30x11	48x8	700	900	**20**	30x22	72x10	1200	1500
12	30x13	54x8	750	950	..	.....	.....	....	....

Dewatering Wheels

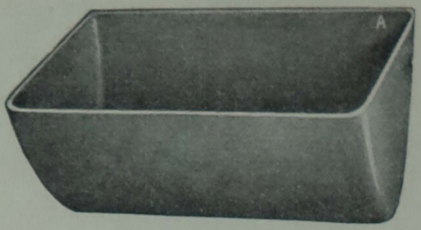


Used to dewater, dilute pulps from jigs, sand tables and for tailings disposal.

Further information and prices will be sent upon request.

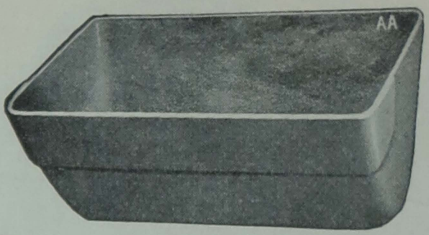
Malleable Iron MS Buckets

Style A



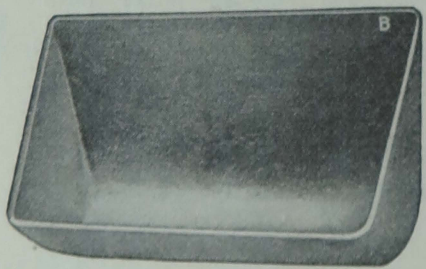
Length Inches	Width or Projection Inches	Each	Depth Inches	Approx. Cap. Cu. In	Weight Pounds
4	2¾	$.31	3	16	1.0
5	3½	.50	3¾	36	1.5
6	4	.64	4¼	55	2.3
7	4½	.76	5	85	3.1
8	5	.90	5½	115	4.2
9	6	1.30	6¼	181	5.9
10	6	1.45	6¼	204	6.8
11	6	1.55	6¼	223	7.4
12	6	1.65	6¼	246	7.9
12	7	1.90	7¼	332	10.5
14	7	2.20	7¼	391	12.1
15	7	2.35	7¼	425	12.4
16	7	2.60	7¼	467	14.0
14	8	3.00	8½	509	16.7
16	8	3.40	8½	593	18.9
18	8	3.75	8½	668	21.1
20	8	4.30	8½	743	23.3
24	8	5.40	8½	887	27.5
18	10	5.85	10½	1053	33.0

Style AA



Length Inches	Width or Projection Inches	Each	Depth Inches	Approx. Cap. Cu. In.	Weight Pounds
6	4	$.70	4½	55	2.7
8	5	1.00	5½	115	4.4
10	6	1.50	6¼	204	7.1
11	6	1.65	6¼	223	7.6
12	6	1.80	6¼	246	8.4
12	7	2.10	7¼	332	10.9
14	7	2.45	7¼	391	13.9
15	7	2.60	7¼	425	14.2
16	7	2.85	7¼	467	15.9
14	8	3.30	8½	509	17.5
16	8	3.75	8½	593	20.8
18	8	4.10	8½	668	23.0
24	8	6.15	8½	887	30.5

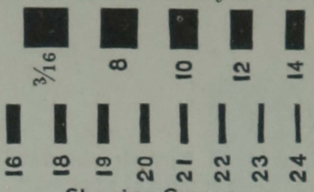
Style B



Length Inches	Width or Projection Inches	Each	Depth Inches	Approx. Cap. Cu. In.	Weight Pounds
4	1½	$.25	2¼	6	.4
7	3½	.58	5	55	2.2
8	3½	.65	5	65	2.3
10	4	1.10	5½	107	4.0
12	5½	1.65	7½	233	6.5
16	6½	2.60	9	412	13.5

Salem Elevator Buckets

Regular Sizes and Heavy Gauges



Showing Gauges

The Salem Elevator Bucket is used for handling all classes of materials in many different industries. This type of bucket is of one-piece construction and stamped from one piece of sheet metal with rounded contour throughout, smooth in form, durable in service and clean in handling and delivery of materials.

There are no seams in front nor on the ends, the laps being made on the back and bottom at the ends. On the back the laps are riveted or spot welded; on the bottom the end pieces are bent under and hammered tight.

This bucket has its front cut to an angle of 23 degrees below the horizontal when its back is vertical. It has been proven by experience that this angle gives the best results in capacity and discharge for the ordinary run of usual materials.

Capacities are the actual cubic contents for the various buckets even full-"struck" measurement, and are not the result of inaccurate and exaggerated calculations. They may be found lower than given for similar sizes of comparable buckets, but they may be depended upon as real and correct.

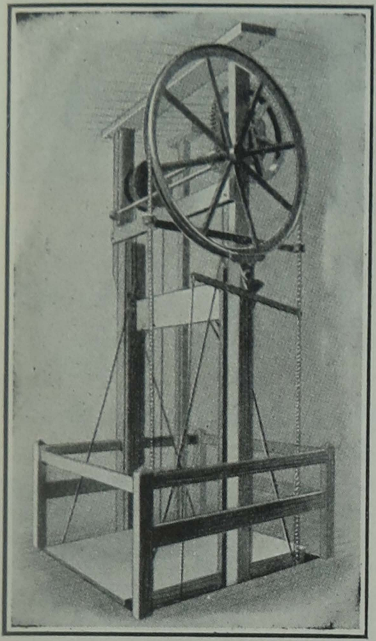
Bucket Size Inches	Capacity Cubic Inches	Price, Each — Thickness of Steel 12 Ga.	10 Ga.	8 Ga.	3/16 in.
5 x4	41	$.73	....	....	....
5½x4	45	.80	....	....	....
6 x4	49	.88	....	....	....
7 x4½	66	.97	$1.15	....	....
8 x5	98	*1.05	1.25	$1.45	$1.65
9 x5	110	*1.12	1.35	1.57	1.78
10 x5	122	1.19	1.45	1.69	1.91
10 x5½	156	*1.27	1.51	1.75	1.96
9 x6	168	1.26	1.52	1.78	2.00
10 x6	187	*1.40	*1.69	1.97	2.19
11 x6	206	1.58	1.90	2.20	2.43
12 x6	225	*1.69	*2.05	2.37	2.61
13 x6	244	1.75	2.18	2.51	2.76
14 x6	263	1.90	2.30	2.65	2.90
15 x6	282	1.98	2.38	2.73	2.98
16 x6	301	2.05	2.45	2.80	3.06
18 x6	339	2.30	2.72	3.09	3.37
20 x6	377	2.50	2.94	3.34	3.64
10 x7	260	1.70	2.10	2.45	2.70
11 x7	286	1.85	2.25	2.60	2.85
12 x7	312	2.00	2.40	2.75	3.00
13 x7	338	2.10	2.53	2.88	3.13
14 x7	364	2.20	2.65	3.00	3.25
15 x7	390	2.30	2.78	3.13	3.38
16 x7	416	2.40	2.90	3.25	3.50
18 x7	468	2.65	3.10	3.50	3.75
20 x7	520	2.90	3.40	3.80	4.25
16 x8	486	2.70	3.15	3.55	4.00
18 x8	548	2.85	3.30	3.75	4.25
20 x8	610	3.05	3.50	4.00	4.55
22 x8	672	3.30	3.75	4.30	4.90
24 x8	734	3.60	4.05	4.65	5.30
26 x8	796	3.90	4.40	5.05	5.75
28 x8	858	4.25	4.80	5.50	6.25
30 x8	920	4.60	5.25	6.00	6.80

*These sizes are carried in stock for immediate shipment.

Extra charge for galvanizing on application.

Hand Power Elevators

Side Post Hand Elevators

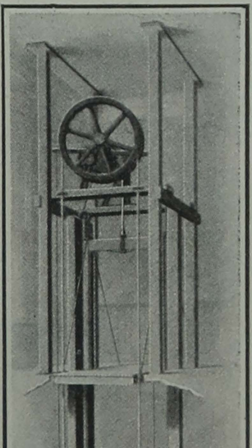


The Side Post Hand Elevator has three wire cables. Made in 1500 to 3000 pounds capacity. Provided with safety catches on the platform, which securely catch and hold the platform should the ropes break. The improved brake will stop and lock the platform at any point by pulling the brake rope. The brake rope can be operated from the platform or any floor, and it does not matter which rope is pulled, or which way it is pulled, it stops and locks the platform. The cables are made fast to iron spiral-grooved drums. All bearings run in improved anti-friction steel roller bearings. The elevator is counter-weighted to raise the platform without any assistance when the platform has no load. The hand rope is inside of the hatchway and is accessible either from the platform or from the floors. The hatch hole should be 16 inches wide, postwise, and 2 inches longer from front to back, than the platform. In ordering, give the width of the platform across the front first. Twelve feet in height is required on the top floor.

Drawings are furnished from which any good carpenter can erect the elevator. Complete except lower floor timbers. Top floor timbers are furnished with machinery fitted, but no fence or enclosure.

Capacity Pounds	Platform Feet	Travel Feet	Shipping Wt., Lbs.	Price Each
1500	5x6	16	2100	**$385.00**
2000	5x6	16	2600	**466.00**
3000	5x6	16	2800	**555.00**

Grip Sheave Hand Elevators



This elevator is built with platforms any size not larger than listed.

The machine is self-contained and has roller bearings.

It is easy to erect, according to the drawings, which are sent with each machine.

The machine, platform, counter-weight, ropes, cables and hardwood guide strips are furnished but no timbers.

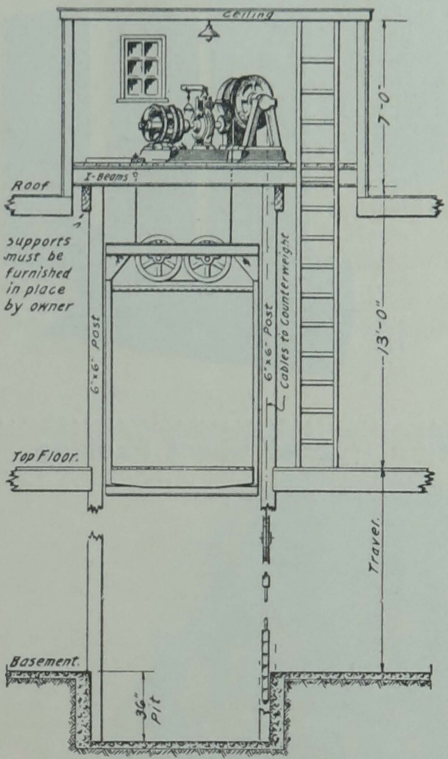
Thirteen feet is required on the top floor. The hand rope may be on the side if the counter-weight box can be at the back.

The hatch hole should be 16 inches wider and 3 inches longer than the platform.

In stating the size of platform, give the width across the front first.

Capacity Pounds	Platform Feet	Travel Feet	Shipping Wt., Lbs.	Price Each
500	3x3	16	750	**$200.00**
1000	5x5	16	1700	**333.00**

Electric Freight Elevators



Direct Connected Electric Freight Elevator with Overhead Traction Type Machine

The illustration shows one of the latest style direct connected electric freight elevators with an over-head V-groove traction type machine.

This style of machine is now taking the place of drum type machines for all purposes. It has many important advantages; in case of over-travel it will not pull the cage or counter-weights up into the overhead beams. The machine is suitable for any travel, so that buildings may be altered in height and the machine will still be suitable.

It is less expensive and much easier to install than the old drum type machine, and the cables last much longer.

Equipped with electric brake, over-travel switches, slack cable switches, and governor make it safe and reliable.

This elevator is built in all sizes and capacities for either 3-phase alternating or direct current.

When ordered for shipment, all the machinery is furnished, including motor and controller mounted on the overhead I-beams, the platform, cables, sheaves, counter-weights hardwood guide strips, and drawings for erecting, but no timbers.

Can be erected complete anywhere.

Prices upon application.

Elevators

Platform elevators can be furnished in several different styles other than those listed, such as sidewalk and cellar elevators, hand power carriage or automobile elevators electrical and belt driven, in any capacity or size platform. When making inquiry in regard to elevators, it is important that the following information be furnished.

First.—Class of elevator (hand power, electric, automobile or sidewalk).

Second.—Usual load desired to be raised on elevator.

Third.—Greatest load desired to be raised.

Fourth.—Kind of merchandise the elevator is desired to be used for.

Fifth.—Size of platform wanted; give width across front first.

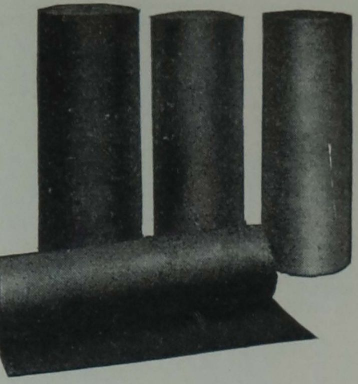
Sixth.—Height of each story from floor to floor, including joists and the height from the top floor to the ceiling.

Seventh.—Make a diagram showing position of elevator in the building, stating on which side it is desired to load and unload.

The hatch holes for hand power elevators should be 16 inches wider postwise and 2 inches longer from front to back than the proposed platform.

Information and prices will be sent upon request.

Red Sheet Packing



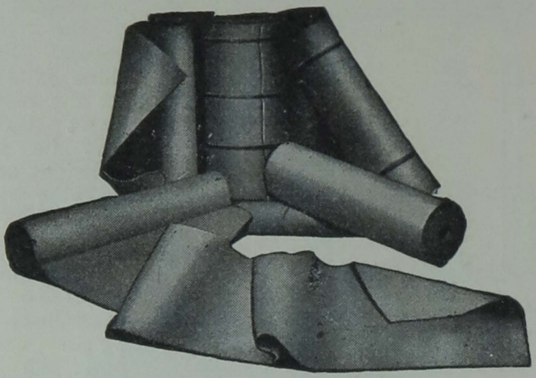
Will pack an air, steam, hot or cold water joint equally well. It is a non-conductor. Particularly adapted to packing expansion or steam joints, as it does not burn or char.

Joints should be faced with plumbago, lamp black or chalk.

Thickness In.	Wt., Lbs. per Sq. Yd.	Thickness In.	Wt., Lbs. per Sq. Yd.
1/32	3 1/8	1/8	12 5/8
1/16	6 1/2	3/16	17 1/8
3/32	9 3/8	1/4	21 5/8

Per pound.. ....

Cloth Insertion Rubber Sheet Packing



Recommended for use with water which is cold or merely warm at pressures up to 300 pounds per square inch or for air which is practically free from oil at pressures up to 100 pounds and for low pressure steam.

Made in two grades, with cloth insertion, cloth one side or cloth both sides.

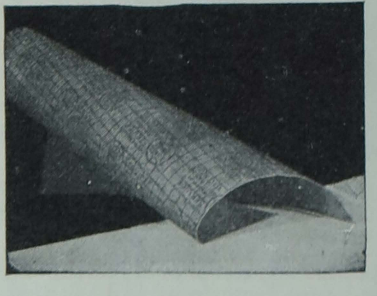
Thickness In.	No. of Plies: Cloth Inserted	Cloth One Side	Cloth Both Sides	Thickness In.	No. of Plies: Cloth Inserted	Cloth One Side	Cloth Both Sides
1/16	1	2	2	3/16	3	3	4
3/32	1	2	2	1/4	4	4	5
1/8	2	3	3	..	..	..	..

The cloth whether used as an insertion, or on the outside, counts as one ply. Standard width 36 to 40 inches, and standard weight per roll is 175 to 250 pounds. Approximate weights per square yard are as follows:

Grade No.	Thickness Inches	Weight, Pounds, per Square Yard: C.I.	C.O.S.	C.B.S.
1	1/16	4.875	4.875	5.125
2	1/16	4.75	4.75	5.

Price..................................per pound ......

No. 60 Johns-Manville Service Sheet Packing



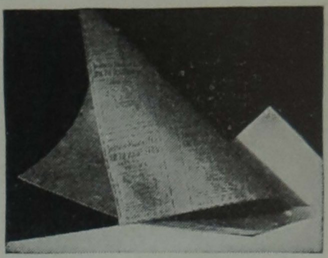
For packing parallel surfaces of flanges against steam, air, water, ammonia, oil and various acidulated and alkaline or other chemical solutions.

Furnished in standard sheets 54x63 inches, 36x126 inches and 54x126 inches all thicknesses. Also made in sheets 108x126 inches, thickness 1/32 inch up.

Thickness.................inches	1/8	1/16	1/32	1/64
Per Sq. Yd..........................	.....	.....	.....	.....
Approx. Wt. per Sq. Yd..........	10.67	5.33	2.67	1.34

No. 70 J-M Asbestos Sheet Packing

For Hot Oil



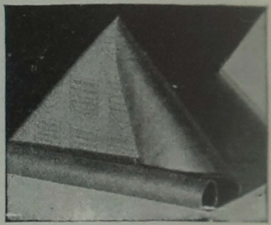
Designed for use against hot oil.

Made of asbestos and special compounds selected to meet the severe requirements of such service.

In sizes 40x41 inches, 1/64 to 1/8 inch thick, inclusive.

Style No. 70.................................per lb. ....

No. 101 Johns-Manville Mobilene Sheet Packing



This packing is used for packing gas and gasoline engine parts.

It is made of asbestos fabric of great strength, interwoven with fine brass wire, and impregnated with a special compound to withstand high pressure and temperature.

Made with red compound on one side, so the packing will stick to flange when joint is broken, and graphite on the other to allow joint to be easily taken apart.

Furnished in rolls 48 inches wide, weighing 250 pounds each; 1/32 and 1/16 inch thick.

No. 101...per pound .....

No. 100 Johns-Manville Kearsarge Asbesto-Metallic Sheet Packing

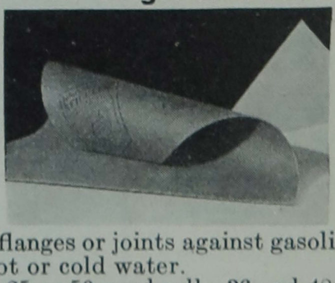
Generally used where surfaces are somewhat rough or uneven and where a sheet of a soft nature is therefore required.

This packing is constructed of tightly twisted asbestos yarn, spun with brass wire to give additional strength, woven into asbestos-metallic cloth and impregnated with heat-resisting compound.

Furnished 1/32 to 1/4-inch thick, in rolls 48 inches wide.

Thickness.................................inches	1/32
No. 100..............................per square yard	...
Approximate Weight per Square Yard.........pounds	4 1/2
Approximate Weight per Roll...................pounds	250

No. 711 J-M Seigelite Sheet Packing

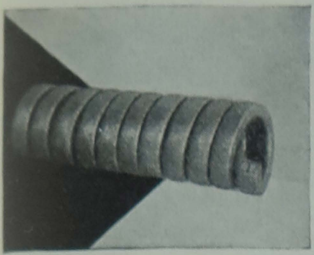


For packing flanges or joints against gasoline, benzine, oil, greases, and hot or cold water.

Furnished in 25 or 50-yard rolls, 36 and 48 inches wide, 3/32 and 1/8 inch thicknesses only, in sheets 36x48 inches.

Thick. In.	Per Sq. Yd.	Approx. Wt., Lbs per Sq. Yd.	Thick. In.	Per Sq. Yd.	Approx. Wt., Lbs. per Sq. Yd.
.01	$.85	.5	1/16	$4.50	2.55
1/64	1.05	.70	3/32	6.80	3.83
.02	1.35	1.	1/8	9.20	5.1
1/32	1.90	1.46	...	....	....

J-M Diagonal Rod Packing



For use on rods which are scored, worn, or out of alignment.

Muslin wrapping, which is used for protection in shipping, should be removed before the packing is used.

Style No. 183
High Pressure

For service against medium or low-pressure steam.

Made of a round cushion of rubber and duck, combined with diagonally-cut wedges of first-grade laminated duck frictioned with rubber, all thoroughly lubricated and held in place with a braided cotton jacket.

Sizes ⅜ inch and up, in coil form, Style No. C-183, spiral form, Style No. S-183, and ring form Style No. R-183.

Style No. **183**................................per lb. .....

Style No. 184—Low Pressure

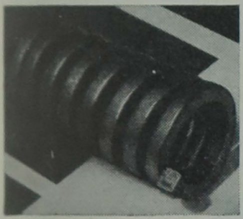
For service against low pressure steam and cold water.

Same construction as Style No. 183 except that the round cushion is made of braided jute, instead of rubber and duck.

Sizes ⅜ inch and up, in coil form, Style No. C-184, spiral form, Style No. S-184, and ring form Style No. R-184.

Style No. **184**................................per lb. .....

No. 33 Johns-Manville Universal Piston Packing



For packing pistons of inside packed pumps handling hot or cold water, air, and brine, where packing space is ⅜ inch or over.

Made only in sizes ⅜ inch and larger, in coil style No. C-33; spiral style No. S-33; ring style No. R-33.

Coil Style No. C-**33**.—Furnished in coils approximately 12 feet long, packed several coils to the box, as follows:

Size......................in.	**⅜**	**7/16**	**½**	**9/16**	**⅝**	**11/16**	**¾**	**⅞**	**1**
Coils per Box..............	4	3	4	3	3	2	2	2	2

Spiral Style No. S-**33**.—Furnished in boxes, each containing one length of packing approximately 12 feet long.

Ring Style No. R-**33**.—1. Unless otherwise specified, rings will be packed in boxes containing the following weights:

Rod.......inches	Under **1**	**1** to **2**	**2** to **3**	**3** to **4**	Over **4**
Weight....pounds	3	5	10	15	20

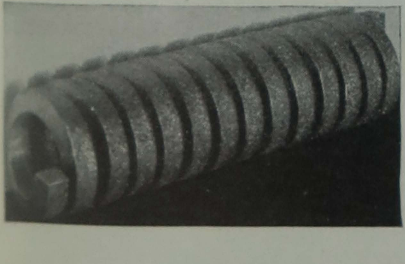
2. May be ordered in sets to fit piston exactly.

Approximate Weight of 100 Linear Feet

Size......................inches	**⅜**	**½**	**⅝**	**¾**	**⅞**	**1**
Weight....................pounds	10	18	24	36	45	60

Price.....................................per pound ....

No. S-271 J-M Cross Diagonal Packing

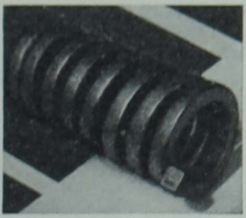


For service against hot water, varying hot and cold water conditions, low-pressure steam, ammonia, etc.; for use on reciprocating rods and plungers where packing space is ¼ inch or more. Made up of plies of duck, graphited.

In spiral form, No. S271; coil form, No. C271; ring form, No. R271, Spirals in 12½-foot lengths, 1 to a box. Coils in boxes of 10 to 12 lbs. for sizes ¼ to 1 in. Rings packed in boxes.

Size..............inches	**¼**	**5/16**	**⅜**	**½**	**⅝**	**¾**	**⅞**	**1**
Wt., 100 Lineal Ft..lbs.	4	6½	8¾	15	27	35	48	60

Johns-Manville Kearsarge Rod Packing



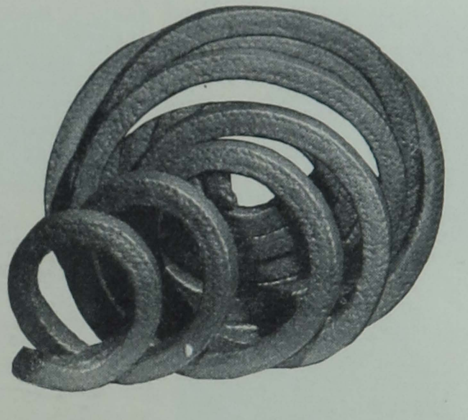
No. S-166, Spiral Style

Designed for service against steam, air and gas up to 500 degrees F. on reciprocating rods and plungers where the packing space is ⅜ inch or more.

Furnished with heat resisting lubricant and graphited, Spiral form, Style No. S-166, in Ring form, Style No. R-166. Coil form, Style No. C-166.

Prices upon application.

J-M Interlocked Braided Asbestos Packing



Used for packing reciprocating or rotating rods against saturated or superheated steam, hot or cold, fresh or salt water, oils and weak caustics or acids.

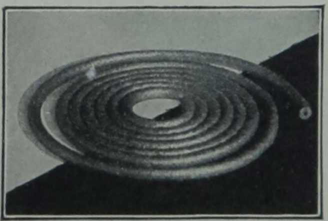
Each individual strand of long fibre asbestos yarn is so interlocked in the braiding as to form an integral structure. Braided square, rather than pressed into shape.

Each strand is thoroughly lubricated and graphited.

Furnished without wire, in coil form, Style No. C-255, or ring form, Style No. R-255; with wire, in coil form, Style No. C-257, or ring form, Style No. R-257. Sizes, ¼ inch and up.

Prices upon application.

Johns-Manville Universal Rod and Plunger Packing



No. C-32. Coil Style

For packing rods and outside-packed plungers where space between rod and box is ¼ inch or more—against steam, air, water and various fluids.

Made of asbestos and cotton fabrics, which have been treated with rubber cements, built up together and wrapped around a rubber core.

This packing is regularly furnished in spiral form, Style No. S-32. Also available in coil form, Style No. C-32 and ring form, Style No. R-32.

Spiral Style No. S-**32**.—Furnished in boxes, each containing one length of packing 12 feet long.

Coil Style No. C-**32**.—Furnished in 12-foot lengths.

Size..................inches	**¼** to **½**	**⅝** to **¾**	**⅞** to **1**
Weight................pounds	5 to 6	8 to 10	12 to 14

Ring Style No. R-**32**.—Unless otherwise specified rings will be packed in boxes containing the following weights:

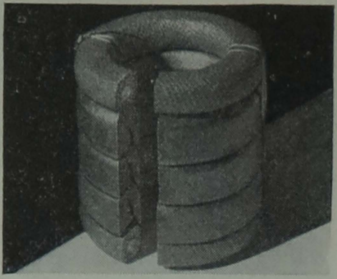
Diameter Rod..in.	Up to **1**	**1** to **2**	**2** to **3**	**3** to **4**	Over **4**
Wt. per Box.lbs.	3	5	10	15	20

Approximate Weight of 100 Linear Feet

Size..............inches	**¼**	**5/16**	**⅜**	**½**	**⅝**	**¾**	**⅞**	**1**
Weight............pounds	5	8	10	17	24	32	43	61

Prices upon application.

Johns-Manville Sea Ring Packing



For use on reciprocating rods and plungers in good condition for service against steam, hot or cold water, air, gas, brine, etc.

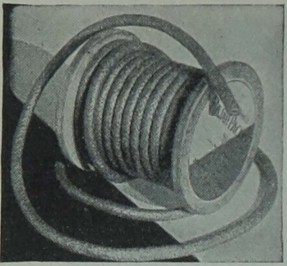
For rod ¾-inch diameter or more and packing space of not less than 5/16 inch.

Flexible lips press against the rod only when a tendency to leak forces them to do so. Work only when action is needed. Depending upon the nature of the service, J-M Sea Rings are made of asbestos fabric or duck, or of a combination of the two, impregnated with heat and oil-resisting materials selected to meet the particular conditions.

Furnished in ring form only.

Per Inch.. ......

Johns-Manville Rajah Packing



Used against steam, hot or cold water or oil, on valve stems as well as reciprocating rods and plungers, with small packing space.

Made of long-fibre asbestos yarn, braided up solid, treated with a heat-resisting compound and graphited.

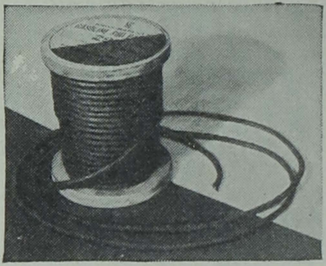
Its particular construction makes it ideal for packing valve stems against superheated steam and other high temperature conditions.

Furnished in coil form, Style No. C-2, round cross-section and Style No. C-6, square; or in ring form, square, Style No. R-6.

Sizes ⅛ inch up.

Prices upon application.

J-M Gasoline Rod Packings



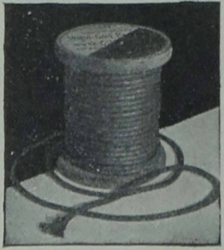
No. C-293 Coil Form, Twisted
No. C-322 Braided Coil Form (Round)
No. C-323 Braided Coil Form (Square)
No. R-323 Ring Form (Square Cross-Section)

For service against cold gasoline and other cold mineral oils, is use on rods and valve stems.

Made from selected long-fibre asbestos yarn, treated with a special lubricating compound that seals the pores of the packing.

Style No. **C-293**, Coil Form ⅛ In. and Up.....per lb. ....
Style No. **C-322**, Coil Form ⅛ In. and Up.....per lb. ....
Style No. **C-323**, Coil Form 3/16 In. and Up.....per lb. ....
Style No. **R-323**, Ring Form..................per lb. ....

Johns-Manville Mogul Coil Packing



No. C193 Twisted
No. C222 Braided Round Cross Section
No. C223 Braided Square Cross Section

For packing small rods, valve stems, etc.

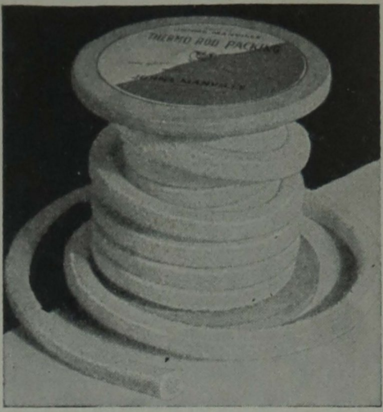
Furnished in continuous lengths, on reels weighing 5, 10, 25 and 50 pounds. It is also furnished on 1 pound spools for sizes ½-in. and less.

Approximate Weight of 100 Linear Feet

Size........inches	⅛	3/16	¼	5/16	⅜	½	⅝	¾	⅞	1
No. **C193**.....lbs.	1	2½	4	5½	8	13	21	32	36	50
No. **C222**.....lbs.	1	2	3½	5¼	7	12½	20	28	40	53
No. **C223**.....lbs.	..	..	5¼	7	12½	20	28	40	53	67

Mogul Packing.............................per pound .....

Johns-Manville Asbestos High Temperature Packing

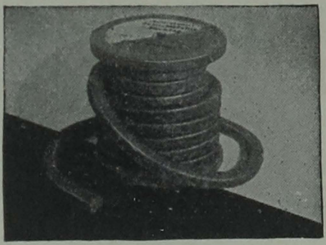


No. 789 Coil Style

Made from pure asbestos; designed for high temperature oils and gases. Regularly furnished in coil form, Style C-789. Also available in ring form, Style R-789. Can be furnished round or square; with or without graphite and lubricant. Unless otherwise specified, will be furnished square, without graphite and lubricant. Sizes ¼-inch and up.

Per Pound........ ....

J-M Semi-Metallic Packings



For service against steam, air, water, oil, etc., in use on centrifugal rods, in either high or low-pressure service, with temperatures up to 500° F.

Can also be used on reciprocating rods and plungers, either alone or in combination with other rod packings.

Plaited square from a combination of non-abrasive metal and asbestos fibre, and thoroughly lubricated and graphited. Being practically frictionless, it does not wear or score the rod. It has considerable resiliency.

Available in sizes ¼ inch and up.

Style No. 350

For service against steam, air, water, oil, etc.

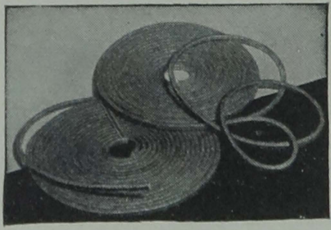
Style No. C-**350**, Coil Form....................per lb. ....
Style No. R-**350**, Ring Form..................per lb. ....

Style No. 351

Designed and lubricated for use against gasoline and other cold mineral oils.

Style No. C-**351**, Coil Form....................per lb. ....
Style No. R-**351**, Ring Form..................per lb. ....

No. 10 Johns-Manville Jewett Coil Packing



Used against steam, hot and cold water (fresh or salt), air, gas, crude and heavy oils and chemicals requiring a packing free from rubber.

Made of long-fibre asbestos yarn with copper wire insertion and lead ribbon core, treated with a heat-resisting lubricant and graphited.

Furnished in coil form, Style No. C-10, square cross section.

Sizes ⅛ inch and up.

No. **10**.................................per pound ....

Candle Wick

In Balls

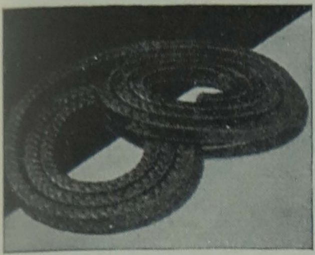
Carefully manufactured of cotton specially selected for the purpose.

For packing small valve stems, etc.

Furnished in ⅛ and ¼-pound balls.

Per Pound................ ....

Johns-Manville Centripac Packing

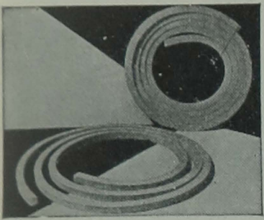


Made of strands of long-fibre asbestos yarn, with or without wire in each strand, which are plaited up square, then thoroughly lubricated and graphited.

Furnished in coil form, Style No. C-7. Wire inserted is furnished in coil form, Style No. C11. Also furnished with a special lubricant designed for service against gasoline, and other cold mineral oils in coil form, Style No. C-18. This packing is also available in ring form. Coils are furnished in continuous lengths put up on 5, 10, 25 and 50-pound reels. Sizes, ¼, 5/16, ⅜, ½, ⅝, ¾, ⅞ and 1 inch.

Per Pound.. ....

No. 182 Johns-Manville Aqua Hydraulic Piston Packing

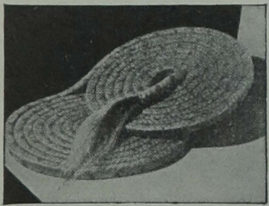


Recommended for the most severe conditions for service against hot or cold water and oil for use on pistons of inside packed pumps. It is also adapted for combining with soft ring packing for hydraulic service. Made of specially selected duck, cross laminated with highest grade of pure rubber friction obtainable. Can be furnished stitched if desired.

Size Inches	Wt., Lbs. per 100 Linear Ft.	Size Inches	Wt., Lbs. per 100 Linear Ft.
¼	4¾	⅝	27
5/16	6¾	¾	38
⅜	10	⅞	64
½	17	1	72

No. **182**..................................per pound ...

Johns-Manville Flax Packing
No. 189



A pure braided flax packing of the highest quality. Braided up solid without centers and corners, and lubricated with special lubricant, identified by red diamond-shaped marking. Furnished in coil form, Style C-189 and in ring form, Style R-189.

No. **189**................................per pound ......

Approximate Weights

Furnished in sizes ¼-inch and up, put up in substantial cardboard boxes, weighing approximately as follows:

Size Inches	Wt., Lbs. per 100 Ft.	Wt., Lbs. per Box	Size Inches	Wt., Lbs. per 100 Ft.	Wt., Lbs. per Box
¼	3½	6 to 10	⅞	35	10 to 14
5/16	6	6 to 10	1	48	10 to 14
⅜	7½	6 to 10	1⅛	60	12 to 15
½	12	10 to 14	1¼	75	12 to 15
⅝	20	10 to 14	1⅜	90	15 to 20
¾	28	10 to 14	1½	105	15 to 20

No. 240 (W. P. H.) Flax Packing

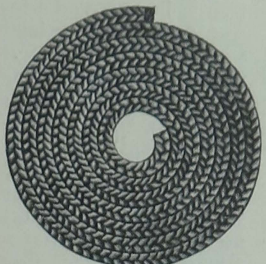
For exceptionally severe high pressure cold water hydraulic service. It is braided up solid from pure flax fibre without centers or corners, treated with pure Japan wax and finished with graphite. Regularly furnished in coil form, Style C-240, or in spiral form, Style S-240. Also available in ring form, Style R-240. In all forms it is available in three densities, hard (H), medium (M), or soft (S). Medium density furnished unless otherwise ordered.

For identification, this flax has a groove or indentation running along center of two opposite sides of packing.

Slightly heavier than No. 189.

No. **240**....................................per pound ....

No. C-4191 Johns-Manville Braided Jute Packing



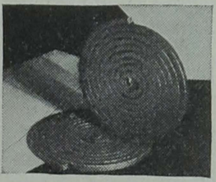
This packing is primarily recommended for cold water service, but, on account of its quality, it is better suited to hot water service, as well as cold water service, than is other brands of jute.

No. C-4191 is a coil packing braided from first quality jute, with center and corners of the same material, and lubricated.

Furnished in sizes ¼ inch and up, put up in substantial cardboard boxes.

Price, No. C-**4191**..........................per pound .....

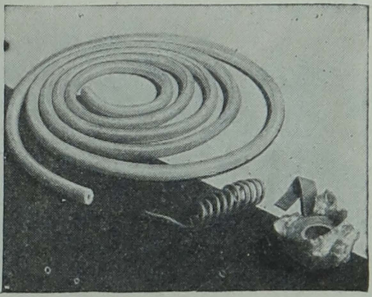
No. C-4181 J-M Braided Jute Packing



A coil packing braided from first quality jute, with center and corners of the same material, treated with a cold water compound and graphited.

No. C-**4181**..........per lb. ....

No. 124 J-M Kearsarge Tubular Gasketing



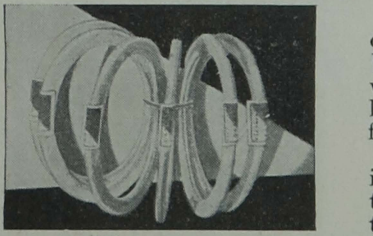
To make boiler manhole and handhole gaskets in cases of emergency or wherever a gasket with a round cross-section is required, as in the case of grooved flanges.

This gasketing is primarily an emergency packing, but is used extensively for making odd or irregular shaped gaskets or for packing joints where grooves are provided for the packing to rest in, as in the case of the doors of sterilizers, etc.

Furnished in 12½-foot lengths ⅜ inch and up in 5 and 10-pound boxes with tape and lead.

No. **124**..............................per pound .....

No. 118 Johns-Manville Kearsarge Jointless Tube Plate Gaskets
For B. & W. and Heine Tube Plates



Made seamless, without a joint, from asbesto-metallic yarn, woven into hose or tubular form and properly folded.

The advantage in using jointless gaskets for tube plate work is that there is no tape joint to interfere with perfect seating, so necessary when gaskets with a narrow flange are used.

Gaskets are light in weight, strong and treated with high heat-resisting compound.

For B. & W. Boilers

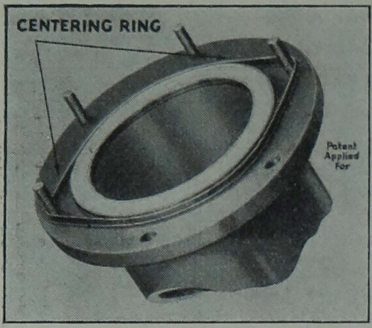
Size, Inches	Thickness	Approx. Wt. Lbs. Per 100
4 15/32x5 13/32x¼ Oval	3 Ply	4⅜
4 15/32x5 13/32x¼ Oval	4 Ply	5½
4 25/32x4 31/32x¼ Square	3 Ply	5¾
4 25/32x4 31/32x¼ Square	4 Ply	6¾

For Heine Boilers

Size, Inches	Thickness	Approx. Wt. Lbs. Per 100
3½ i. d. x ⅜ Flange Round	3 Ply	4
3½ i. d. x ⅜ Flange Round	4 Ply	5½
3½x4½ i. d.x⅜ Flange Oval	3 Ply	5
3½x4½ i. d.x⅜ Flange Oval	4 Ply	5⅞

Style D Flexitallic Gaskets

For Pipe Flanges



Suspension at two points has proved adequate for plain, raised face, Van Stone and Cranelap flanges. For all sizes, guides are designed to fit over diametrically opposite bolts. Tolerances limit radial movement yet permit quick installation even in inaccessible places. For full-face fittings, companion flanges and flange unions use Style F without centering ring. For male and female and tongue and groove joints use Style R without centering ring.

Made of cold rolled steel. For temperatures above 500 degrees F., stainless steel or Monel is recommended. Copper or bronze is used for special fluid conditions. For some services, it is advisable to have the gasket proper made of one metal, the guide of another.

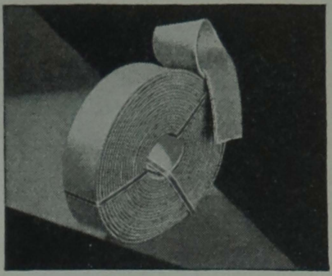
Performance of flexitallic gaskets is in large measure the result of patented reinforcements which preserve the interlock and retain mechanical elasticity. The number of reinforcements varies according to service pressure.

Thickness, ⅛ inch.

Fitting Press			150 Pounds				300 Pounds			
Pipe Size In.	I.D. In.	O.D. In.	Diam. of Bolt Circle to Bolt Centers In.	Each	No. of Bolts	Bolt Diam. In.	Diam. of Bolt Circle to Bolt Centers In.	Each	No. of Bolts	Bolt Diam. In
1	1⅜	1⅞	3⅛	$.12	4	½	3½	$.15	4	⅝
1¼	1¾	2⅜	3½	.14	4	½	3⅞	.18	4	⅝
1½	2⅛	2¾	3⅞	.15	4	½	4½	.20	4	¾
2	2⅝	3⅜	4¾	.21	4	⅝	5	.27	8	⅝
2½	3⅛	3⅞	5½	.22	4	⅝	5⅞	.28	8	¾
3	3¾	4¾	6	.28	4	⅝	6⅝	.35	8	¾
3½	4¼	5¼	7	.35	8	⅝	7¼	.44	8	¾
4	4¾	5⅞	7½	.42	8	⅝	7⅞	.53	8	¾
4½	5¼	6½	7¾	.47	8	¾	8½	.58	8	¾
5	5¾	7	8½	.51	8	¾	9¼	.64	8	¾
6	6⅞	8¼	9½	.60	8	¾	10⅝	.75	12	¾
8	8⅞	10⅜	11¾	.84	8	¾	13	1.05	12	⅞
10	11	12½	14¼	.96	12	⅞	15¼	1.20	16	1
12	13	14¾	17	1.20	12	⅞	17¾	1.50	16	1⅛
14	14¼	16	18¾	1.66	12	1	20¼	2.08	20	1⅛
16	16¼	18¼	21¼	2.16	16	1	22¼	2.70	20	1¼
18	18¼	20¼	22¼	2.42	16	1⅛	24¾	3.03	24	1¼
20	20¼	22¾	25	3.38	20	1⅛	27	4.23	24	1¼
24	24¼	27	29½	4.42	20	1¼	32	5.52	24	1½
			400 Pounds				600 Pounds			
1	1⅜	1⅞	3½	$.15	4	⅝	3½	$.15	4	⅝
1¼	1¾	2⅜	3⅞	.18	4	⅝	3⅞	.18	4	⅝
1½	2⅛	2¾	4½	.20	4	¾	4½	.20	4	¾
2	2⅝	3⅜	5	.27	8	⅝	5	.27	8	⅝
2½	3⅛	3⅞	5⅞	.28	8	¾	5⅞	.28	8	¾
3	3¾	4¾	6⅝	.35	8	¾	6⅝	.35	8	¾
3½	4¼	5¼	7¼	.44	8	⅞	7¼	.44	8	⅞
4	4¾	5⅞	7⅞	.53	8	⅞	8½	.53	8	⅞
4½	5¼	6½	...	.58	8	⅞	...	.58	8	..
5	5¾	7	9¼	.64	8	⅞	10¼	.64	8	1
6	6⅞	8¼	10⅝	.75	12	⅞	11½	.65	12	1
8	8⅞	10⅜	13	1.05	12	⅞	13¾	1.05	12	1⅛
10	11	12½	15¼	1.20	16	1⅛	17	1.20	16	1¼
12	13	14¾	17¾	1.50	16	1¼	19¼	1.50	20	1¼
14	14¼	16	20¼	2.08	20	1¼	20¾	2.08	20	1⅜
16	16¼	18¼	22¼	2.70	20	1⅜	23¾	2.70	20	1½
18	18¼	20¼	24¾	3.03	24	1⅜	25¾	3.03	20	1⅝
20	20¼	22¾	27	4.23	24	1½	28½	4.23	24	1⅝
24	24¼	27	32	5.52	24	1¾	33	5.52	24	1⅞

List prices are for gaskets of cold rolled steel; if temperature exceeds 500 degrees, stainless steel or monel is recommended on which prices are increased 75 per cent.

No. 120 Johns-Manville Kearsarge Asbesto-Metallic Gasketing Tape



For making odd or irregular shaped gaskets to pack joints against steam, air, water, ammonia, and various acidulated, alkaline and other chemical solutions.

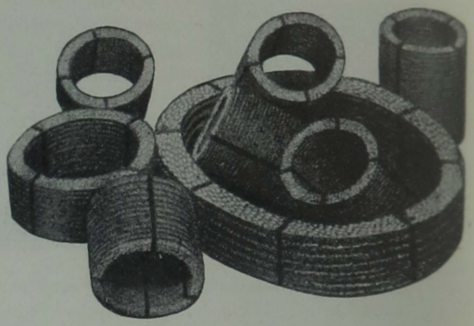
Made of asbesto-metallic yarn, woven into fabric and treated with a high heat-resisting, resilient cement.

Furnished in widths ½ inch and greater, and in thicknesses of 1/16 and ⅛ inch in 200-foot coil, and 3/16 and ¼ inch in 100-foot coil. Cannot be made in widths less than ½ inch.

Prices upon application.

Asbestos Folded Gaskets

For Manholes, Handholes and Flange Joints



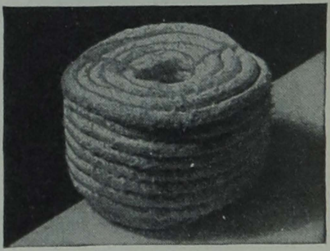
These gaskets will stand any temperature and pressure of steam. They may be reused many times. Folded by hand and made of asbestos wire inserted sheeting.

Furnished in any size, shape or thickness. In ordering, give inside diameters and width of flange.

Price ....per pound . . .

J-M Asbestos Rope Packing

Asbestos Twisted Rope Packing



Style No. 4200

Style No. 4200 is a pure asbestos rope packing of the felted type. Style No. 4196 is made from commercially pure asbestos roving. Style No. 200 is similar to Style No. 4196 but is made from pure asbestos roving. Style No. 196 is also similar to Style No. 4196 but commercially pure asbestos roving of a higher quality is used. Style No. 203 is made from pure asbestos roving with the strands in themselves composed of a number of smaller strands.

Sizes of all rope packing, ⅜-inch up.

Braided Rope Packing

Style No. 566

Style No. 566 round and Style No. 787 square, commercially pure-braided jackets over twisted core. Sizes ¼-inch to ¾-inch with one braided jacket, ⅞-inch up with two.

Style No. 857 round and Style No. 869 square, pure-braided jackets over pure twisted core. Sizes as above. Style No. 702 round and Style No. 733 square, commercially pure-solid braided rope. Sizes ¼-inch up.

Style No. 788 round and Style No. 873 square, pure solid braided rope. Sizes ¼-inch up. Style No. 580 plain and Style No. 581 wire inserted, commercially pure square plaited rope. Sizes ¼-inch up.

Furnished in 10, 25 and 50-pound reels.

J-M Asbestos Wick Packing

Made in the following six standard styles:

Style No. 4202 is made by twisting together several strands of pure felted asbestos with a small cotton yarn in center.

Style No. 4199 is a single strand wick made of pure twisted felted asbestos with a small cotton yarn in center.

Style No. 4195 is made of a single strand of commercially pure asbestos roving.

Style No. 199 wick is made of a single strand of pure asbestos roving.

Style No. 195 wick is made by twisting together several strands of commercially pure asbestos roving.

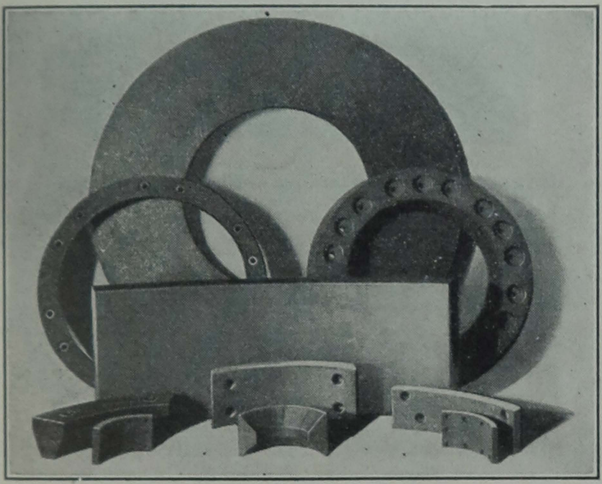
Style No. 202 is made of several strands of pure asbestos roving twisted together.

Size of all wick packings, approximately ¼ inch.

Per Pound.. ....

Condor Asbestos Friction Material

For Industrial Use



Type 1000

Folded and hydraulically compressed lining. Medium friction for extreme heavy duty work.

Type 2000R

Solid Interwoven band lining. High friction for light and medium service.

Type 2000HD

Solid Interwoven band lining. High friction for heavy duty service.

Type 3000

Asbestos metallic pulp blocks moulded to exact size and shape. Medium friction adapted for power applied brakes or for general use.

Type 4000

Asbestos metallic moulded pulp blocks same as Type 3000 except higher friction. This type is rarely required.

Type 5000

Homogeneous asbestos moulded pulp lining formed to correct drum diameter. Medium friction used for either internal or external manually operated clutches or brakes.

Type 6000

Moulded asbestos pulp blocks of medium friction and low specific gravity. For use on clutch blocks.

Type 7000

Heavy duty cloth type clutch facing. Same quality as Type 1000 lining.

Type 8000

Asbestos metallic moulded industrial clutch facings, ideal for the generation of driving teeth for dry clutches.

Type 9000

Asbestos pulp clutch facings of high tensile strength that are not affected by immersion in oil.

Prices upon application.

No. 50 Mound Gasket and Washer Cutters

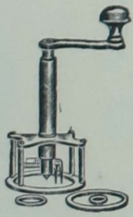
Designed for cutting gaskets and washers any size up to and including 24 inches outside diameter.

Can be used with bit brace, drill press or by hand.

Made of the best material. Highly polished and nickel-plated.

Price, No. **50**.................................each **$3.50**

Washer and Gasket Cutters

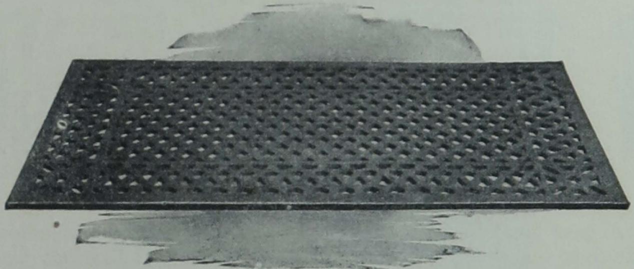


Holds the material in place by a patent process. Cuts the washer without damaging the material. Will cut material down to writing paper thickness. Will cut asbestos as well as every other kind of sheet packing.

Cuts ⅜ to 2 inches in diameter.

Price, No. **0**......................each **$1.15**

Perforated Rubber Mats



Perforated mats are furnished in four colors; black, red, white, and green. These colors are clean and attractive in appearance, besides giving exceptional wear.

With proper care, a perforated mat should last for years.

Should be handled carefully to avoid the possibility of tearing out the edges or causing breaks between perforations. Should not be hung over radiators, because excessive heat is injurious. Individual sections should not be larger than ten by three feet.

Made in six styles of perforations; information upon request.

Standard lettering is in plain block letters, 3, 4, 5, 6, 7 or 8 inches in height.

Special lettering and special designs furnished upon request.

Thickness Inches	Price per Square Foot	Thickness Inches	Price per Square Foot
¼	....	⅝	....
⅜	....	¾	....
½	....	..	....

Cocoa Matting

Cocoa matting can be furnished in any shape for tank bottoms, etc.

3-Foot Widths	per yard	$1.25
1-Foot Widths	per foot	.16

Air Drill Hose

THE MANHATTAN RUBBER MFG. DIV.
OF RAYBESTOS-MANHATTAN INC.
Condor
AIR HOSE
PASSAIC, N.J.
REG. U.S. PAT. OFF.

Condor is made with plies of heavy duck and has popularized itself through having stood the tests of time and service. It is designed for heavy rough service, has an oil resisting tube, thick rubber cover and insertions of heavy fabric. This is the grade recommended for mine, quarry and contracting work.

Grenadier brand has plies of seamless braid instead of duck; otherwise, it resembles Condor brand closely.

Average Working Pressures, Pounds per Square Inch

Size Inches	Condor		Grenadier	
	4-Ply	5-Ply	2-Braid	3-Braid
⅜	. . .	. . .	250	300
½	225	. . .	225	275
⅝	. . .	. . .	200	250
¾	180	210	175	225
1	. . .	180	. . .	185
1¼	. . .	150	. . .	150
1½	. . .	. . .	. . .	150

50-Foot Lengths—Price per Foot

Condor—Duck Plies—Wrapped Cover

Size Inches	Ply	Per Foot	Size Inches	Ply	Per Foot
½	4	$.30	1¼	5	$.78
¾	4	.41	1½	6	1.10
1	5	.57	2	6	1.40

Grenadier—Braided Plies—Wrapped Cover

Size Inches	2-Braid per Ft.	3-Braid per Ft.	Size Inches	2-Braid per Ft.	3-Braid per Ft.
¼	$.31	. . .	1	. . .	$.73
⅜	.35	. . .	1¼	. . .	.90
½	.37	$.42	1½	. . .	1.21
⅝	.44	.50	2	. . .	1.72
¾	.49	.58	. . .	. . .	. . . .

Compensated Air Hose

50-Foot Lengths

A new type hose which withstands surge and pulsation. Made to resist expansion and eliminate internal chafing. Can stand highest working pressures with wide margin of safety.

Made in ⅜, ½, ⅝, ¾ and 1-inch sizes.

Moulded-Braided Air Hose

Smooth Cover—Long Lengths

This hose is good for all service; very flexible. Maximum length, size ½ to 1 in., 500 ft.; size 1¼ and 1½ in., 350 ft.

Condor

Condor is best grade, with red cover.

Average Working Pressures, Pounds per Square Inch

Size Inches	2-Braid	3-Braid	Size Inches	2-Braid	3-Braid
½	200	250	1	. . .	160
⅝	. . .	. . .	1¼	. . .	135
¾	. . .	200	1½	. . .	100

Paranite

Paranite is highly recommended for contractors' service.

Average Working Pressures, Pounds per Square Inch

Size Inches	No. Braid	O.D. Inches	Work. Press. Lbs. per Sq. Inch	Size Inches	No. Braid	O.D. Inches	Work. Press. Lbs. per Sq. Inch
½	2	⅞	150	¾	3	1¼	165
½	3	1	200	1	3	. . .	150
⅝	2	1	135	1¼	3	. . .	100
⅝	3	1⅛	175	1½	3	. . .	75

Pneumatic Tool Hose

Wrapped Cover—50-Foot Lengths

For all types of pneumatic tools, hammers, riveters, chipping, hoists, etc. Has oil-proof, non-porous tube.

Condor is the best grade, with red rubber cover.

Whalebone is good for general service.

Delhi is made for light work.

Average Working Pressures, Pounds per Square Inch

Size Inches	Condor		Whalebone		Delhi	
	4-Ply	5-Ply	5-Ply	7-Ply	5-Ply	7-Ply
⅜	250	. . .	170	. . .	160	. . .
½	225	250	145	170	125	160
⅝	200	225	125	140	110	125
¾	175	200	110	130	100	125

Air and Water Hose

In made up lengths for rock drills.

Equipped with Gardener-Denver, Dixon, Mulconroy, or other standard couplings.

Condor Duck Wrapped Air Hose

¾ In. x 4 Ply. . . . . .per foot . . . . .
1 In. x 5 Ply. . . . . .per foot . . . . .

Coupled, 50-foot lengths.

Paranite Braided Hose

For Air

¾ In. x 3 Braid. . . . . per foot . . . . .
½ In. x 2 Braid. . . . . per foot . . . . .

Coupled, 50-foot lengths.

For Water

½ In. x 2 Braid. . . . . per foot . . . . .

Coupled, 10-foot lengths.

Steam Hose

Wrapped Cover

THE MANHATTAN RUBBER MFG. DIV.
OF RAYBESTOS-MANHATTAN INC.
Condor
STEAM HOSE
PASSAIC, N.J.

Condor and Composite—50-Foot Lengths

Condor is high grade type with duck plies. Composite is high grade type with one ply of braid over duck plies.

Maximum Working Pressures Dry Saturated Steam in Pounds per Square Inch

Size Inches	4-Ply	5-Ply	6-Ply
½	160	175	. . .
¾	140	150	160
1	135	145	160
1¼	. . .	135	150
1½	. . .	130	135

Delhi—50-Foot Lengths

A good grade of hose for average service.

Maximum Working Pressures Dry Saturated Steam in Pounds per Square Inch

Size Inches	4-Ply	5-Ply	6-Ply
½	110	120	. . .
¾	100	110	125
1	90	100	110
1¼	. . .	90	100
1½	. . .	80	90

Super-Master

A new type for high pressures up to 200 pounds steam. Made with asbestos and steel wire insertion.

Standard List Prices Per Foot

Size Inches	3-Ply	4-Ply	5-Ply	6-Ply	7-Ply	8-Ply
½	$.47	$.56	$.70	$.84	$.98	$1.12
¾	.57	.71	.87	1.05	1.23	1.41
1	.70	.87	1.07	1.28	1.50	1.70
1¼	.85	1.04	1.30	1.56	1.82	2.08
1½	1.02	1.25	1.56	1.87	2.18	2.50
2	1.34	1.66	2.07	2.49	2.90	3.32
2½	1.66	2.08	2.60	3.12	3.64	4.16
3	2.00	2.80	3.50	4.20	4.90	5.60
3½	2.50	3.50	4.40	5.25	6.15	7.00
4	3.10	4.30	5.40	6.45	7.55	8.60
4½	3.75	5.20	6.50	7.80	9.10	10.40
5	4.45	6.20	7.75	9.30	10.85	12.40
5½	5.25	7.30	9.15	10.95	12.80	14.60
6	6.12	8.55	10.70	12.85	14.95	17.10
6½	7.10	9.90	12.40	14.85	17.35	19.80

To obtain price on higher plies, add to the 4-ply price, 25 per cent for each additional ply.

Water Hose

Duck Plies—Wrapped Covers

THE MANHATTAN RUBBER MFG. CO.
REG'D
Condor
HOSE
TRADE MARK
PASSAIC, N.J.

Condor and Composite—50-Foot Lengths

Condor is best grade duck type with tough red rubber cover. Composite is high grade duck and braid type with black cover.

Average Working Pressures, Pounds per Square Inch

Size Inches	3-Ply	4-Ply	5-Ply
1	150	200	225
1¼	125	175	200
1½	125	150	180
2	100	100	125
2½	...	80	110

Delhi—50-Foot Lengths

Delhi is good duck hose for all around service. Has black rubber cover.

Average Working Pressures, Pounds per Square Inch

Size Inches	3-Ply	4-Ply	5-Ply
1	110	125	150
1¼	105	125	140
1½	100	110	125
2	75	80	100
2½	..	65	80

Duckbraid—50-Foot Lengths

Duckbraid is made with plies of duck and ply of braid under cover.

Average Working Pressures, Pounds per Square Inch

Size Inches	3-Ply	4-Ply	5-Ply
1	125	150	175
1¼	115	150	175
1½	115	125	150
2	95	90	110
2½	..	80	95

Moulded-Braided—Long Length

Condor and Dreadnaught

Condor is best grade with smooth red cover. Dreadnaught is same grade and type but with brown corrugated cover.

Average Working Pressures, Pounds per Square Inch

Size Inches	2-Braid	3-Braid	Size Inches	2-Braid	3-Braid
½	...	180	1	120	165
⅝	...	170	1¼	110	150
¾	...	160	1½	110	150

Whipcord

Whipcord is for average service with smooth black cover

Average Working Pressures, Pounds per Square Inch

Size Inches	2-Braid	3-Braid	Size Inches	2-Braid	3-Braid
½	...	175	1	110	150
⅝	...	160	1¼	100	125
¾	...	150	1½	100	125

Standard List Prices per Foot

Size Inches	2-Ply	3-Ply	4-Ply	5-Ply	6-Ply
½	$.20	$.25	...	...	...
¾	.25	.30	$.37	$.46	...
1	.33	.40	.50	.62	$.75
1¼	.42	.50	.62	.77	.93
1½	.50	.60	.75	.93	1.12
1¾	.58	.70	.87	1.08	1.30
2	.66	.80	1.00	1.25	1.50
2¼	.75	.90	1.12	1.40	1.68
2½	.83	1.00	1.25	1.56	1.87
3	.99	1.20	1.50	1.87	2.25

Gates Vulco Garden Hose

THE GATES RUBBER CO.
GATES VULCO
DENVER, U.S.A.

This hose is built like a cord tire of live-resilient rubber and 2 plies of elastic-twist cord. Tough, extra thick corrugated cover resists wear of concrete and gravel and cannot be snagged by stones, nails, etc. Will stand more than 7 times average city water pressure.

Comes in 25 and 50-foot lengths and 500-foot reels. Size ⅝ inch can be had in 12½-foot lengths. Lengths shipped with couplings unless otherwise specified.

Furnished in black or red.

Size.................................in.	½	⅝	¾
No. Cords per Braid....................	36	36	48
Weight per 100 Feet.................lbs.	23	29	35¼

Prices upon application.

Gates Greenlawn Garden Hose

GATES RUBBER CO.
GATES
Greenlawn
HOSE
DENVER U.S.A.

A premium quality hose built to wear. Built like a cord tire, with an innerlining of tough, seamless rubber over which are 2 layers of strong, double-braided cords, separated by a layer of friction-resisting rubber. Tough olive green cover resists wear.

Comes in 25 and 50-foot lengths and 500-foot reels.

Size.................................in.	⅝	¾	1
No. Cords per Braid....................	72	96	96
Weight per 100 Feet.................lbs.	33	43	52

Prices upon application.

Condor Creamery and Packers Hose

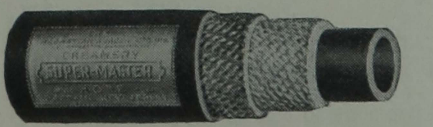
THE MANHATTAN RUBBER MFG. DIV.
OF RAYBESTOS-MANHATTAN, INC.
Condor
CREAMERY HOSE
PASSAIC, N.J.

A high grade hose made throughout from choicest materials. It has a thick steam resistant tube, 3 plies of strong duck and 1 ply of open breaker fabric which prevents separation of the cover, and a thick fat and wear resistant cover.

Condor is made with either white or black covers. For creamery use, white is usually required, and for packing houses, black. Specify color. Furnished in 25 and 50-ft. lengths. Breaker strip included.

Size......................inches	½	¾	1	1¼	1½
Ply..............................	4	4	4	4	4
Per Foot.........................	$.40	.50	.70	.80	.90

Super-Master Creamery Hose



Specially made for washing and sterilizing service in creameries, dairies, ice-cream plants and other food plants.

Tough, fat and wear-resisting purple rubber cover. Special steam-resisting inner tube. Cover and tube not affected by animal fats.

Interlacing type fabric eliminates cover peeling. Strong specially woven flexible rubber bonded duck plies.

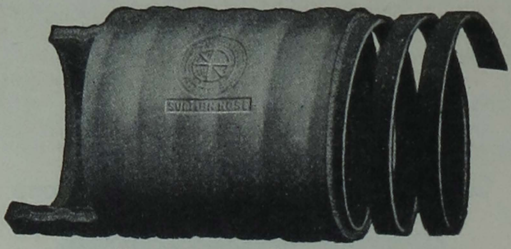
Hose resists wear from hard rough floors. Has maximum flexibility and is non-kinking.

Can be supplied with a rubber nozzle built-in as an integral part of the hose at extra cost.

Size...........................in.	½	¾	1	1¼	1½
Per Foot.........................	$.55	.65	.85	.95	1.05
No. of Plies.....................	4	4	4	4	4

Suction Hose

Smooth Bore



Wire Lined or Rough Bore

Suction Hose is made with wire reinforcement (except Hard Rubber Type) to prevent walls of hose from collapsing under vacuum. Ends of suction hose are made plain for shank type couplings or are enlarged for Iron Pipe Nipples. Orders should always specify which style of ends is desired. Hose larger than 6 inches I.D. should not be used in lengths longer than 15 feet.

Smooth Bore Suction Hose is made of round galvanized wire embedded entirely in the wall of the hose allowing a perfectly smooth tube or water-way. The use of round wire permits a greater adhesion between the plies of duck and a more solid hose body. Recommended for the heavier kinds of service or for the carrying of thick fluids.

Wire Lined Suction Hose is made on galvanized flat wire which is brought flush with inner surface of rubber tube or lining. Recommended for the lighter kinds of work or other clear liquids. An advantage of this hose is that the rounded edge wire used prevents any cutting into the body of hose.

Delhi Brand

Designed for average service.

Size Inches	Smooth Bore Round Wire Insertion per Ft.	Rough Bore Flat Wire Lined per Ft.	Size Inches	Smooth Bore Round Wire Insertion per Ft.	Rough Bore Flat Wire Lined per Ft.
1½	$1.15	$1.05	5	$5.03	$4.52
2	1.31	1.15	6	6.24	5.66
2½	1.64	1.34	8	8.93	8.04
3	1.81	1.60	10	11.16	10.04
3½	2.04	1.88	12	12.80	11.53
4	2.38	2.19	..	.....	.....

Wixom Brand

Designed for light service. This type of hose is very popular with street contractors.

Size Inches	Smooth Bore per Ft.	Rough Bore per Ft.	Size Inches	Smooth Bore per Ft.	Rough Bore per Ft.
1½	$1.00	$.93	3½	$1.93	$1.79
2	1.24	1.09	4	2.28	2.09
2½	1.54	1.26	5	4.79	4.30
3	1.72	1.53	6	5.94	5.41

All above prices apply on hose with plain or enlarged ends in 8 foot lengths or over. Lengths under 8 feet, plain or enlarged ends, add 10 per cent to the above prices.

Hard Rubber Suction Hose

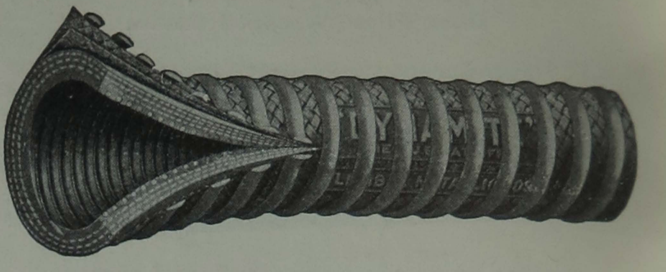
Recommended in small sizes for very light suction service. The hard rubber parts provide sufficient rigidity so that hose will not collapse under light vacuum.

Delhi Brand

No wire insertion; duck inserted; wrapped cover.
Furnished in 50-foot lengths only.
Made only in sizes up to 1½ inch.

Size..........inches	¾	1	1¼	1½
4-Ply..........per ft.	$.28	.34	.39	.46

Dynamite Flexible Metallic Steam Hose



For rock drills, steam cranes, steam hammer-pile drivers, syphoning dredges and barges, blowing out boiler tubes, blowing off boilers, car inspection, firing up and blower connections, electric lighting equipment, steam connection between cars, heating cars at stations, thawing pipes, tire-heating machines, washing out and filling boilers, boiler testing, etc.

The spiral steel reinforcement runs through the inside of the hose for its entire length, holds the tube in place, and prevents buckling or collapsing until the life of the rubber is entirely gone. It also prevents injury from couplings or nipples.

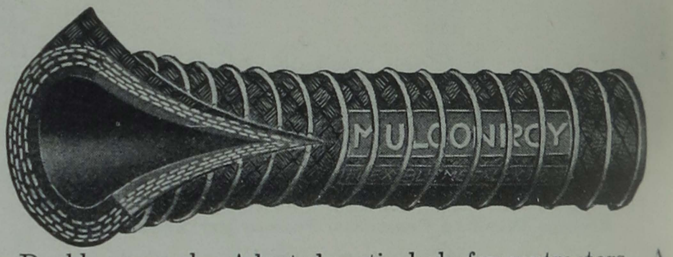
Illustration also shows how Dynamite is protected against outside abuse. Two braided steel jackets, entirely covering the hose, and an additional jacket of spiral steel spring wire, are applied by machines that set the wire so that it will not unwind when cut.

For use around steel mills, furnaces, glass plants and other places where hose is subjected to extreme outside heat, it is protected by applying a jacket of asbestos between the wire braidings. This construction is particularly adapted to mud gun work on blast furnaces.

Size Inches	Price per Foot	Size Inches	Price per Foot	Size Inches	Price per Foot
½	$1.17	1¼	$2.08	2	$3.75
¾	1.43	1½	2.53	2½	5.00
1	1.75	1¾	3.14	3	6.25

Mulconroy Flexible Metallic Water Hose

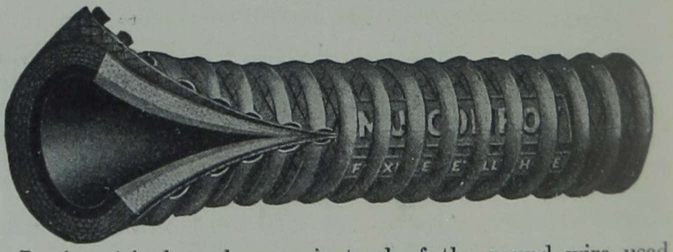
Sizes ½, ⅝ and ¾-inch



Double armored. Adapted particularly for contractors. A braiding of galvanized wires completely covers the hose, over which is an additional armor of round steel spring wire. These reinforcements, adding little to the weight, make the hose strong, prevent kinking and protect it from outside injury.

Prices on application.

Sizes 1-inch and Over

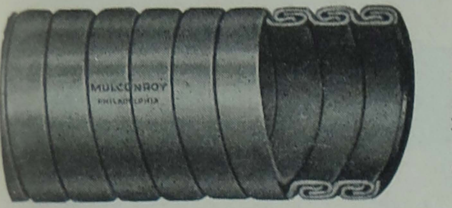


In sizes 1-inch and over, instead of the round wire used on ½, ⅝, and ¾-inch hose, a heavy half-round spiral is supplied for use for very heavy pressure, or where the hose is continually dragged over obstacles or rough surfaces.

Size Inches	Price per Foot	Size Inches	Price per Foot	Size Inches	Price per Foot
1	$ .75	1¾	$1.65	2½	$2.40
1¼	1.05	2	1.85	3	2.90
1½	1.45	2¼	2.15	...	...

Hose with hot water tube—add 10% to above prices.

Mulconroy Flexible Interlocked All Metal Hose



Made in steel and bronze for steam and oil. Packed with chemically treated asbestos, making every joint tight.

Semi-Interlocked

I.D. Inches	Steel per Ft.	Steel Steel Laced per Ft.	I.D. Inches	Steel per Ft.	Steel Steel Laced per Ft.
¼	$.18	$.36	½	$.40	$.66
5/16	.24	.42	¾	.47	.76
⅜	.30	.50	1	.89	1.22

Interlocked—Plain

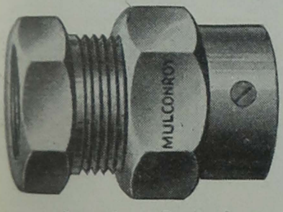
I.D. Inches	Steel per Ft.	Bronze per Ft.	I.D. Inches	Steel per Ft.	Bronze per Ft.
¼	$.24	....	1½	$1.39	$3.12
5/16	.24	$.40	2	1.75	4.06
⅜	.30	.58	2½	2.21	4.64
½	.40	.82	3	2.68	6.38
¾	.70	1.45	3½	3.48	8.70
1	.93	1.86	4	3.48	8.70
1¼	1.15	2.60	5	4.64	13.30

Interlocked—Reinforced

Reinforced with braided bronze or steel wires, covering the hose. Further reinforced with an armor of spiral half round galvanized wire.

	Steel Laced		Bronze		Steel Laced		Bronze
I.D. Inches	Steel per Ft.	Bronze per Ft.	Bronze Laced per Ft.	I.D. Inches	Steel per Ft.	Bronze per Ft.	Bronze Laced per Ft.
¼	$.42	....	....	1½	$1.88	$3.62	$3.77
5/16	.43	$.60	$.62	2	2.38	4.69	4.81
⅜	.52	.80	.82	2½	3.07	5.50	5.63
½	.68	1.08	1.10	3	3.73	7.44	7.61
¾	1.02	1.77	1.81	3½	4.72	9.93	10.15
1	1.30	2.22	2.28	4	4.81	10.00	10.77
1¼	1.58	3.03	3.09	...	....	.....	.....

Mulconroy All Metal Hose Couplings



Standard Packed

Couplings are furnished (unless otherwise specified) with standard iron pipe thread. They are made of extra heavy close texture red brass, and attached to the outside of the hose, insuring full passage way for material to be conveyed.

Soldered

For high pressure and low temperatures.

Size Inches	Per Set	Male Only Each	Female Only Each	Size Inches	Per Set	Male Only Each	Female Only Each
¼	$1.00	$.50	$.67	1½	$4.00	$2.00	$2.67
⅜	1.00	.50	.67	2	6.00	3.00	4.00
½	1.50	.75	1.00	2½	8.00	4.00	5.33
¾	2.00	1.00	1.33	3	12.00	6.00	8.00
1	2.50	1.25	1.67	3½	13.50	6.75	9.00
1¼	3.00	1.50	2.00	4	15.00	7.50	10.00

Standard Packed

For high pressure and high temperatures.

¼	$1.50	$.75	$1.00	1½	$7.00	$3.50	$4.67
⅜	2.00	1.00	1.33	2	.....	....	.....
½	2.50	1.25	1.67	2½	.....	....	.....
¾	3.50	1.75	2.33	3	.....	....	.....
1	4.50	2.25	3.00	3½	.....	....	.....
1¼	5.50	2.75	3.67	4	.....	....	.....

Reinforced Packed

¼	$3.00	$1.50	$2.00	1½	$9.00	$4.50	$6.00
⅜	3.00	1.50	2.00	2	.....	....	.....
½	3.50	1.75	2.33	2½	.....	....	.....
¾	4.50	2.25	3.00	3	.....	....	.....
1	5.50	2.75	3.67	3½	.....	....	.....
1¼	7.00	3.50	4.67	4	.....	....	.....

Underwriters Cotton Rubber Lined Hose

Economy Underwriters Labeled C. R. L. Hose

Furnished in 50-foot lengths.

Single Jacket—Fire Dept.

Size Inches	Initial Test Press. Lbs. on 50-Ft. Length per Sq. Inch	Size Inches	Initial Test Press. Lbs. on 50-Ft. Length per Sq. Inch
2½	300	1½	300
2	300	...	...

Radio-Active Treatment applied to any size Single Jacket Economy Hose at 8 cents per foot net additional. No discounts to any class of trade on treatment.

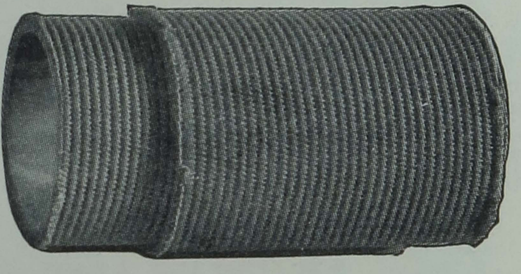
Double Jacket—Fire Dept.

Size Inches	Initial Test Press. Lbs. on 50-Ft. Length per Sq. Inch	Size Inches	Initial Test Press. Lbs. on 50-Ft. Length per Sq. Inch
*3	400	2	400
**3	400	1½	400
2½	400	...	...

*With 2½-in. thread cplgs. **With 3-in. thread cplgs.

Radio-Active Treatment applied to any size Double Jacket Economy Hose at 10 cents per foot net additional. No discounts to any class of trade on treatment.

Municipal Fire Hose



Furnished coupled in 50-foot lengths.

Double Jacket—Cotton Rubber Lined

Brand Name	Price to Fire Depts. per Ft.	Color Stripe	Size Inches	Initial Test Pressure Lbs.	Wt. Lbs. per Length Couplings
Dreadnaught	$1.55	2 Blue	3	400	85
Dreadnaught	1.30	2 Blue	2½	400	70
Condor	1.40	2 Red	3	400	81
Condor	1.20	2 Red	2½	400	65
Fulton	1.05	*1 Red	2½	400	61
Fulton	.80	*1 Red	1½	400	35
Viking	.95	1 Blue	2½	400	60
Viking	.72	1 Blue	1½	400	34

*Inside.

Single Jacket—Cotton Rubber Lined

Brand Name	Price to Fire Depts. per Ft.	Color Stripe	Size Inches	Initial Test Pressure Lbs.	Wt. Lbs. per Length Couplings
Condor	$.80	1 Red	2½	300	46
Condor	.65	1 Red	1½	300	24
Kortlandt	.70	......	2½	250	40
Kortlandt	.56	......	1½	250	20

Radio Active Treatment

The above Municipal Fire Department Hose can be furnished with Radio Active Treated Jackets, green color, mildew proof and moisture repellant at 10 cents per foot additional.

Cotton Rubber Lined Mill Hose

Delhi and Wixom Brands

This type hose is used for some fire protection, but also as a utility hose around the mill yard as in sprinkling or flushing. Both Dehli and Wixom Brands are made from good, uniform length cotton staple and a good age-resisting rubber tube. Delhi has heavier and stronger jackets than Wixom, although either will give long life under average pressures and ordinary conditions.

Mill Hose

Size Inches	Single Jacket per Ft.	Double Jacket per Ft.	Size Inches	Single Jacket per Ft.	Double Jacket per Ft.
1	$.40	...	2	$.65	$.90
1¼	.45	...	2½	.80	1.10
1½	.50	$.70	3	1.10	1.50

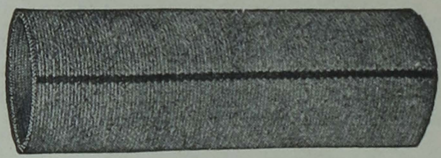
Standard Pin Lug Expansion Ring Couplings for C. R. L. Mill Hose

Size Inches	Single Jacket per Set	Double Jacket per Set	Size Inches	Single Jacket per Set	Double Jacket per Set
1	$1.00	....	2	$2.00	$2.50
1¼	1.25	....	2½	2.75	4.00
1½	1.75	$2.00	...	....	....

A charge of 50 cents per set net will be made for attaching customer's couplings (any size).

Economy Underwriters Unlined Linen Hose

(Flax Tow)

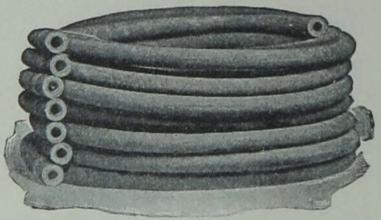


Unlined Linen Hose is to be used for fire protection purposes only and for installation at inside stand-pipes and similar places where it can be kept dry, such as heated rooms, corridors, etc. When pressure is first put on, Linen Hose will sweat and then tighten up as linen expands.

This hose will meet specifications of the Associated Mutual Insurance Companies, Boston (who do not require labels) and Underwriters Laboratories, Chicago (who do require labels) and any local Board of Underwriters throughout the United States.

Size Inches	Uncpld. per Ft.	Expan. Ring Cplgs. Attach per Set	Size Inches	Uncpld. per Ft.	Expan. Ring Cplgs. Attach. per Set
1	$.1666	$.78	2	$.2611	$1.83
1¼	.1750	1.00	2½	.3111	2.39
1½	.2166	1.28	...	.....	...

Delhi Cloth Inserted Tubing



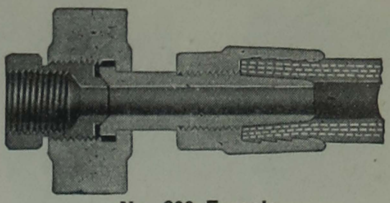
This style of tubing is designed for light conditions where pressures are not high. Sheeting plies; wrapped, red cover; white tube; white friction.

Furnished in 50-foot lengths.

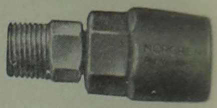
Size Inches	Per Foot	Ply	Outside Diameter Inches
3/16	$.08	3	13/32
¼	.08	3	15/32
5/16	.08	3	17/32
⅜	.09	3	19/32
½	.10	3	23/32
⅝	.12	3	27/32
½	.13	5	*⅞

*Heavy wall.

Norgren Industrial Steel Hose Couplings



No. 200 Female



No. 205 Male

Has Norgren clamp principle—no bolts, nuts or other projecting parts. Has concentric grip and seal. Spud and nut are made up as a ball and socket packingless connection.

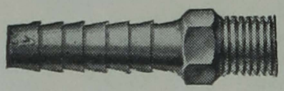
No.	Each	I.P. Size In.	Style	For Hose I.D. In.	For Hose O.D In.
200	$1.50	⅜	Male	½	1 1/16
200	1.50	½	Male	½	1 1/16
200	1.50	⅜	Female	½	1 1/16
200	1.50	½	Female	½	1 1/16
210	2.00	¾	Male	¾	1 5/16
210	2.00	¾	Female	¾	1 5/16
220	3.25	1	Male	1	1 9/16
220	3.25	1	Female	1	1 9/16
205	1.00	⅜	Male	½	1 1/16
205	1.00	½	Male	½	1 1/16
215	1.50	¾	Male	¾	1 5/16
225	2.25	1	Male	1	1 9/16

King Steel Nipples

Machined from cold drawn steel bar. A practical nipple for use on air hose. Ends carefully rounded to prevent injury to tube of hose. Furnished either plain or cadmium plated.

Size Hose In.	Plain Each	Cadmium Plated Each	Slze Iron Pipe Thread, In.	Size Hose In.	Plain Each	Cadmium Plated Each	Size Iron Pipe Thread, In.
¼	$.50	$.55	¼	½	$.50	$.55	⅜
¼	.50	.55	⅜	½	.60	.65	½
⅜	.50	.55	¼	¾	1.00	1.10	½
⅜	.50	.55	⅜	¾	1.00	1.10	¾
⅜	.60	.65	½	1	1.50	1.60	1
½	.50	.55	¼	...	....	....	...

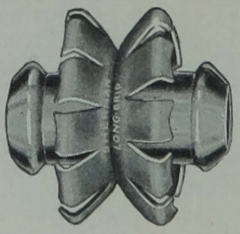
Norgren Standard Male Air Hose Stems



Machined from brass bar stock.

No.	12	22	42
Each	$.25	.25	.25
I.P. Size, inches	¼	¼	¼
For Hose, inches	¼	⅜	½

Sherman Long-Grip Hose Menders

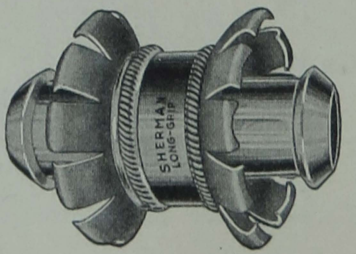


This mender is wrought brass with galvanized steel fingers.

Made in ½, ⅝, ¾, and 1-inch sizes.

Per Dozen.................. $1.00

Sherman Long-Grip Hose Couplings



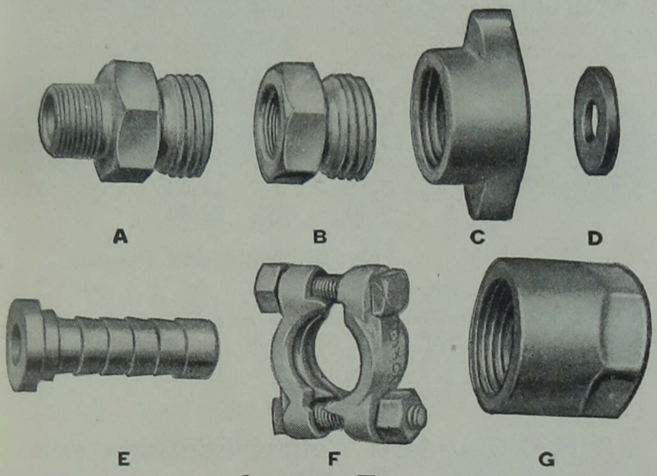
Made of wrought brass. Has galvanized steel fingers.

Made in ½, ⅝, ¾ and 1-inch sizes.

Per Dozen.......... $3.00

Dixon Air Hammer Couplings

Chart Showing Part Nos.



Compact Type

Spud of Style WLD-7 coupling has taper iron pipe thread one end; other end fitting wing nut (in both ½ and ¾-inch sizes) has coarse thread 1 31/64 inches diameter, 8 threads per inch. Thus a ½ or ¾-inch spud may be used with coupling fitting either ½ or ¾-inch hose.

½-Inch

Part No.	Description	Each
J-60	A—Male Spud	$.70
J-65	B—Female Spud	.50
J-47	C—Wing Nut	.50
J-44	D—Washer per 100	4.50
J-45	E—Hose Stem	.60
J-48	F—Clamp (2 Pc.)	.25
DM-5	Coupling Complete, Male	2.05
DF-6	Coupling Complete, Female	1.85

¾-Inch

Part No.	Description	Each
J-50	A—Male Spud	$.70
J-55	B—Female Spud	.50
J-47	C—Wing Nut	.50
J-44	D—Washer per 100	4.50
J-46	E—Hose Stem	.60
J-49	F—Clamp (2 Pc.)	.30
DM-7	Coupling Complete, Male	2.10
DF-8	Coupling Complete, Female	1.90

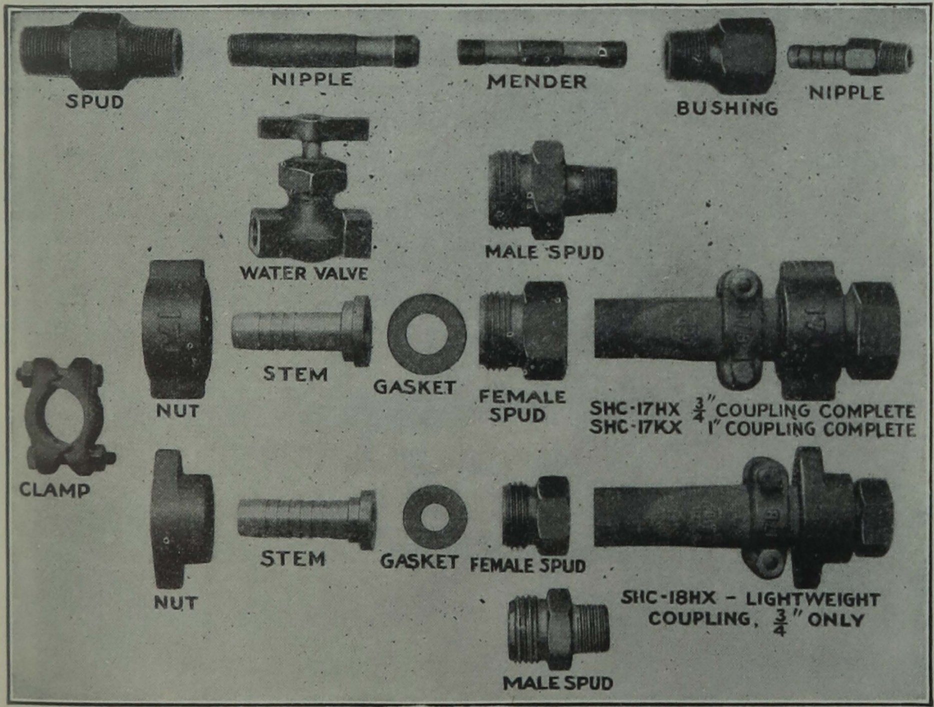
Heavy Type

Spud of Style WHD-9 coupling has taper iron pipe thread one end; other end fitting wing nut (in both ¾ and 1-inch sizes) has coarse thread 1 47/64-inch diameter, 8 threads per inch. Thus a ¾ or 1-inch spud may be used with coupling fitting either ¾ or 1-inch hose.

Part No.	Description	Each
	¾-Inch	
DL-7	A—Male Spud	$.90
DL-8	B—Female Spud	.70
DL-12	C—Wing Nut	.90
DL-16	D—Washer per 100	6.00
DL-18	E—Hose Stem	1.00
DL-17	F—Clamp (2 Pc.)	.30
DM-9	Coupling Complete, Male	3.10
DF-10	Coupling Complete, Female	2.90
	1-Inch	
DL-10	A—Male Spud	$.90
DL-13	B—Female Spud	.70
DL-12	C—Wing Nut	.90
DL-16	D—Washer per 100	6.00
DL-11	E—Hose Stem	1.00
DL-14	F—Clamp (2 Pc.)	.50
DM-11	Coupling Complete, Male	3.30
DF-12	Coupling Complete, Female	3.10
DL-21	G—Special Nut	.90

For ¾-in. hose with o.d. greater than 1 5/16-in., a ⅞-in. clamp (Part J-49-X) is furnished at no extra charge, when specified.

Gardner-Denver Hose Fittings



½ Inch

Part No.	Description	Each
SHC-3Z	½" Water Hose Clamp	$.45
SHC-17A	½" Air Hose Clamp	.45
SHC-62KC	½" Water Hose Nipple (⅜" Pipe Thread)	.45
SHC-13W	Brass Union Nipple (⅜" Pipe Thread)	.25
SHC-13E	Brass Union Nut	.45
SHC-363	½" Hose Nipple (¼" Pipe Thread)	.15
SHC-364	½" Hose Mender	.15
BSH-10	Bolt and Nut for SHC-17A Clamp	.05

¾ Inch

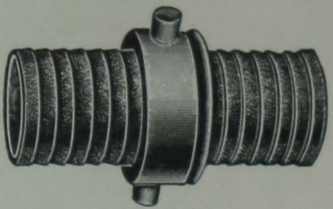
Part No.	Description	Each
SHC-17B	¾" Hose Clamp, Reg.	$.45
*SHC-17N	¾" Clamp, Large	.50
SHC-17HX	¾" Air Hose Couplings, Complete	2.00
SHC-17S	¾" Air Hose Spud (Female Thread)	.50
SHC-17SM	¾" Air Hose Spud (Male Thread)	.50
SHC-17J	¾" Air Hose Nut	.55
SHC-17JP	¾" Air Hose Gasket	.05
SHC-17HA	¾" Air Hose Stem	.45
SHC-13G	¾" Nipple (½" P. T.)	.20
SHC-13GL	¾" Nipple, Long 5½" (½" P. T.)	.25
SHC-13H	¾" Union Nipple	.30
SHC-13E	Brass Union Nut	.45
SHC-360	¾" Hose Mender	.20
BSH32	Bolt and Nut for SHC-17B and SHC-17N Clamp	.05

1 Inch

Part No.	Description	Each
†SHC-17CC	1" Air Hose Clamp, Small	.60
SHC-17C	1" Air Hose Clamp, Reg	.60
SHC-17KX	1" Air Hose Coupling, Comp	2.35
SHC-17L	1" Air Hose Spud	.50
SHC-17J	1" Air Hose Nut	.55
SHC-17JP	1" Air Hose Gasket	.05
SHC-17K	1" Air Hose Stem	.65
SHC-13GC	1" Nipple (¾" P. T.)	.25
SHC-13GB	1" Hose Nipple, Long 5½", (¾" P. T.)	.30
SHC-361	1" Hose Mender	.25
BSH35	Bolt and Nut for SHC-17C and SHC-17CC Clamps	.05

*The large clamp is used on ¾-inch hose having extra heavy walls, and with an o.d. of 1¼ inches. †The small clamp is used on 1-inch hose having light walls, and with an o.d. of 1½ inches or smaller.

Water Hose Couplings

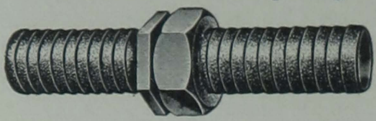


Always supply thread information when ordering to avoid delay.

Sizes 1¼, 1½, 2 and 2½ inches have lugs on female half only; sizes 3, 3½, 4, 5, 6 and 8 inches have lugs on both halves.

Size In.	Per Dozen Full Sets	Per Dozen Half Couplings Female	Per Dozen Half Couplings Male	Size In.	Per Dozen Full Sets	Per Dozen Half Couplings Female	Per Dozen Half Couplings Male
1¼	$10.00	$6.67	$5.00	3½	$120.00	$80.00	$60.00
1½	14.00	9.33	7.00	4	150.00	100.00	75.00
2	24.00	16.00	12.00	5	250.00	167.50	125.00
2½	48.00	32.00	24.00	6	500.00	333.33	250.00
3	75.00	50.00	37.50	8	600.00	400.00	300.00

Steam Hose Couplings

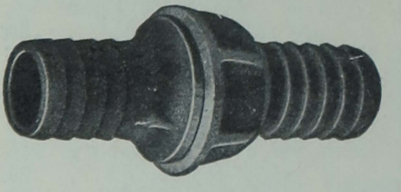


No. 90

Long shank permits use of more than one clamp on each end. Commonly used on hose for steam, oil, gasoline and other purposes where extra precautions must be used to prevent blowing off or leakage. Always furnished iron pipe thread. Other threads furnished at an additional charge.

Size In.	Price, per Dozen Full Sets	Price, per Dozen Half Couplings Female	Price, per Dozen Half Couplings Male	Size In.	Price, per Dozen Full Sets	Price, per Dozen Half Couplings Female	Price, per Dozen Half Couplings Male
¼	$15.00	$10.00	$7.50	1¼	$24.00	$16.00	$12.00
⅜	15.00	10.00	7.50	1½	30.00	20.00	15.00
½	15.00	10.00	7.50	2	42.00	28.00	21.00
¾	15.00	10.00	7.50	2½	72.00	48.00	36.00
1	18.00	12.00	9.00	3	148.00	98.67	74.00

Cast Brass Garden Hose Couplings

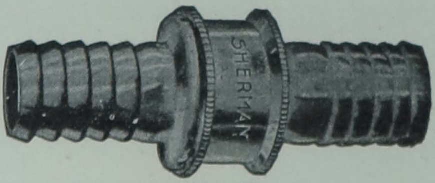


Size Inches	Price per Dozen
½*	$2.00
⅝*	2.00
¾*	2.00
1	4.80

*Hose thread furnished unless otherwise ordered.

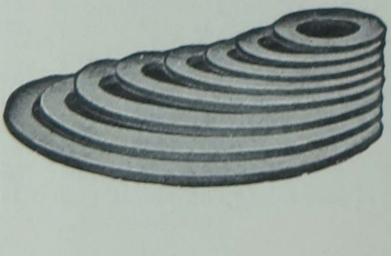
Garden Hose Couplings

Size In.	Price per Doz.
½	$2.40
⅝	2.40
¾	2.40
1	4.40



No. 25

Rubber Hose Washers



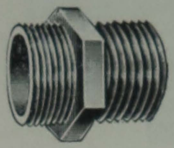
For hose ½ inch and larger.

Price.....per lb. .....

Brass Hose Nipples

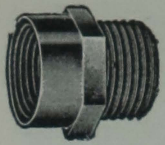
When ordering, state number and thread wanted on each end.

No. 91, Male



Size In.	Per Dozen	Size In.	Per Dozen	Size In.	Per Dozen
⅜	$3.12	1¼	$9.00	*3	$40.00
½	3.12	1½	10.00	*3½	50.00
¾	3.12	*2	14.00	*4	75.00
1	5.50	2½	28.00	...	.....

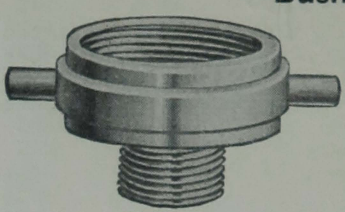
No. 92, Male and Female



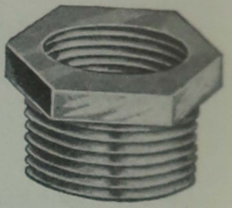
Size In.	Per Dozen	Size In.	Per Dozen	Size In.	Per Dozen
½	$3.12	*1¼	$9.00	*2½	$28.00
¾	3.12	*1½	10.00	*3	40.00
1	5.50	*2	14.00	*3½	50.00

*Made to order only.

A B C Standard Weight Reducers and Bushings



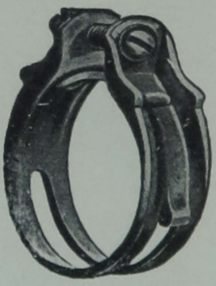
Reducer



Bushing

Size Inches	Per Dozen	Size Inches	Per Dozen	Size Inches	Per Dozen
¾x ½	$6.50	1½x1¼	$12.00	2½x1¼	$23.00
1 x ½	6.50	2 x ¾	13.00	2½x1½	24.00
1 x ¾	6.50	2 x1	14.00	2½x2	26.00
1¼x ¾	8.00	2 x1¼	16.00	3 x2	30.00
1¼x1	10.00	2 x1½	18.00	3 x2½	36.00
1½x ¾	11.50	2½x ¾	20.00	3½x3	60.00
1½x1	11.50	2½x1	22.00	4 x3½	75.00

Brass Hose Clamps



Made of heavy wrought brass, this clamp is rust-proof clear through.

Tongue runs in channel holding it close to hose and making a uniform grip.

Band portion is pliable, grips tight, and can be opened up, removed and used again.

Stiff ears cannot pull together at top when tightened, and also form a perfect nut lock.

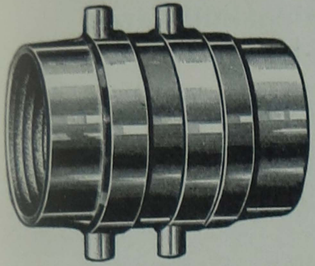
Heavy shoulder engages vise jaws, permitting clamp to be pulled tremendously tight.

For Water Hose

Size In.	Hose Ply	Inside Diam. In.	Gross in Box	Wt. Lbs. per Gross	Price per Doz.	Size In.	Hose Ply	Inside Diam. In.	Gross in Box	Wt. Lbs. per Gross	Price per Doz.
3/16	3	7/16	1	2¼	....	1	2	1 11/32	½	17	$2.00
¼	3	½	1	4	....	1	3	1 7/16	½	18	2.00
⅜	2	⅝	1	4¼	....	1	4	1 17/32	⅓	20	2.00
⅜	3	¾	1	4¾	....	1¼	3	1 21/32	⅓	21	2.50
½	2	⅞	1	5¼	....	1¼	4	1 13/16	⅓	23	2.50
½	3	15/16	1	5¾	....	1½	3	1 15/16	¼	30	3.00
½	4	1 1/32	1	6½	....	1½	4	2 1/16	¼	31	3.00
⅝	3	1 1/32	1	6½	....	2	3, 4	2 9/16	⅙	38	4.00
⅝	4	1 3/32	1	6¾	....	2¼	3, 4	2⅞	1/12	48	6.50
¾	2	1 3/32	1	6¾	....	2½	3, 4	3 1/16	1/12	50	7.00
¾	3	1 3/16	1	6¾	....	3	3, 4	3¾	1/12	72	10.00
¾	4	1¼	1	7¾	....	...	....	....	...	..	.....

For Steam Hose

Size In.	Hose Ply	Inside Diam. In.	Gross in Box	Wt. Lbs. per Gross	Price per Doz.	Size In.	Hose Ply	Inside Diam. In.	Gross in Box	Wt. Lbs. per Gross	Price per Doz.
¾	3	1 7/16	½	18	$2.00	1½	3, 4	2 7/32	¼	33	$3.50
¾	4	1 17/32	⅓	20	2.00	1½	5	2 13/32	⅙	35	4.00
1	3	1⅝	⅓	21	2.50	2	3, 4	2 11/16	⅙	38	5.50
1	4	1 21/32	⅓	21	2.50	2	5	2⅞	1/12	50	6.50
1¼	3	1 15/16	¼	30	3.00	2½	3, 4	3¼	1/12	60	8.50
1¼	4	1 31/32	¼	30	3.00	2½	5	3 9/16	1/12	66	9.50



Standard Expansion Ring Couplings

For unlined linen or light cotton rubber lined mill hose.

Tail piece is expanded into the swivel. In ordering, state kind of hose to be used on and style of thread desired.

No. 1 for Unlined Linen Hose

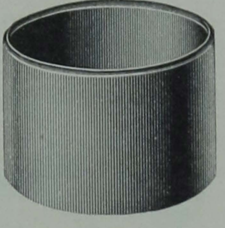
Size........in.	1	1¼	1½	2	2½	2½
Tail No........	0	1	1	1	0	1
Fits Hose O.D........in.	1 5/16	1 7/16	1 23/32	2 3/16	2 41/64	2¾

No. 2 for Cotton Rubber Lined Mill Hose

Size........in.	1	1	1¼	1½	2	2½	2½
Tail No........	2	4	2	2	2	2	3
Fits Hose O.D......in.	1⅜	1 7/16	1 9/16	1⅞	2 5/16	2⅞	3

Prices upon application.

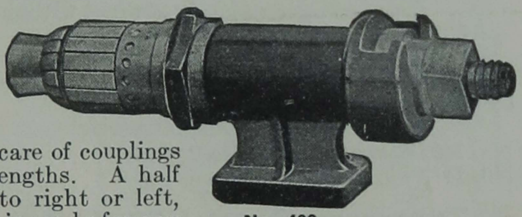
Expansion Rings



The metal used in these rings is a scientifically correct mixture, which experience has shown to be the best adapted for the purpose, to give the maximum co-efficient of expansion without fracture. Made in all sizes from ½ to 6 inches inclusive.

Prices upon application.

Elk Automatic Coupling Expanders



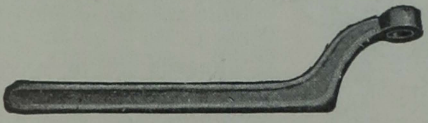
No. 400

Shoulder or stop on expander is threaded and adjustable to take care of couplings of different lengths. A half turn or turn to right or left, and expander is ready for any coupling. On other expanders the operator must build up or down with washers to get it adjusted.

Expander can be held in vise or bolted to bench. A separate expander required for each size hose to be coupled.

Size........inches	1¼	1½	2	2½	3
Price........each	$15.00	18.00	22.00	26.00	30.00
Size........inches	3½	4	4½	5	6
Price........each	$35.00	40.00	45.00	50.00	70.00

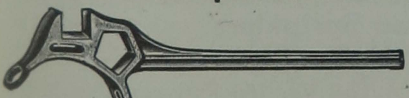
Common Hose Spanners



No........	S-1	S-2	S-3	S-11	S-12
Size........inches	1½	2	2½	3	4

Prices upon application.

Combination Spanner and Hydrant Wrenches



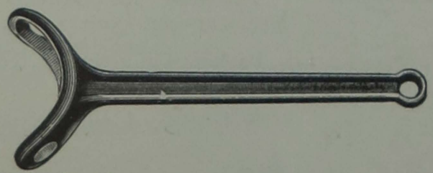
For 2½-inch couplings. Pentagonal hole can be furnished in three sizes.

To determine size, measure from base of opening to the opposite angle.

When ordering specify size required.

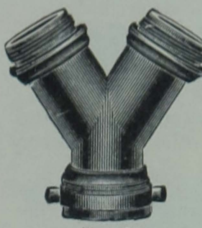
Size 1⅛, 1¼, 1½-Inch........per dozen **$9.70**

Galvanized Reversible Hose Spanners

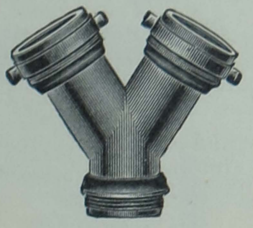


2½-Inch, 10 Inches Long........per dozen **$7.80**

Siamese Connections



No. 27



No. 28

For fire department use only.

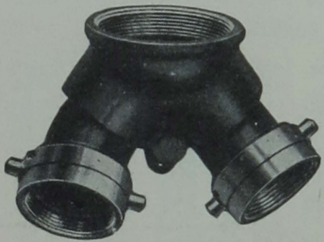
By the use of Siamese No. 27 one stream can be divided into two. No. 28 is used to combine two streams into one. Neither has interior valves and cannot be used for standpipe connections.

Size Inches	Price Each	Size Inches	Price Each
1½x1½x1½	$10.00	2½x2½x2½	$15.00
1½x1½x2½	12.00	2½x2½x3	18.00
2 x2 x2	12.00	2½x2½x4	22.00

Add, extra for polishing. **$3.00** each.

No. 26 Standpipe Siamese Connections

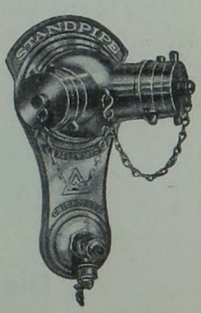
45°, With Single Clapper Valve



For use only at the base of an outside, exposed standpipe in connection with fire escape. Made with a single clapper valve so that one or both streams can be used. Rough finish. Extra for polishing, 2½, 3 or 4 inches, $2.80 each; 5 or 6 inches, $5.00 each.

Dimensions Inches	Price Each	Dimensions Inches	Price Each
2½x2½x2½	$10.00	3x3x3	$18.00
2½x2½x3	10.00	3x3x4	18.00
2½x2½x4	10.00	3x3x5	23.00
2½x2½x5	13.00	3x3x6	25.00
2½x2½x6	18.00	.....	.....

No. 232 Combination Siamese and Sill Cocks



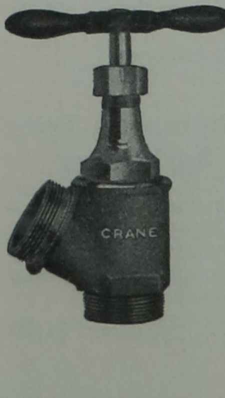
Made of bronze, highly polished and well proportioned.

It is used where the inlet pipe is run through the side of the building.

Made with a 4 or 6-inch outlet and with either 2½ or 3-inch inlets.

Dimensions Inches	Price Each
2½x2½x4	$57.00
2½x2½x6	65.00
3 x3 x6	67.50

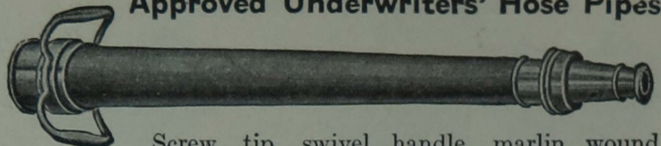
No. 50 Brass Hose Valves



Will be furnished with Chicago hose thread on sizes 2 inches and smaller, and Chicago Fire Department hose thread on the 2½-inch size, or will be furnished with California hose thread or iron pipe thread on all sizes, at regular prices. Any other style thread will be extra. In ordering always specify the thread required.

Size In.	PRICE, EACH Plain	PRICE, EACH Rough N.P.	Size In.	PRICE, EACH Plain	PRICE, EACH Rough N.P.
1	$3.15	$3.65	2	$7.00	$8.00
1¼	3.70	4.30	2½	8.50	9.75
1½	4.75	5.50	...	....	....

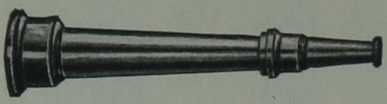
Approved Underwriters' Hose Pipes



Screw tip, swivel handle, marlin wound, painted red. Approved by Associated Factory Mutual Fire Insurance Companies.

Price, 2½x30-inch.......................................each **$14.00**

Screw Tip Hose Pipes

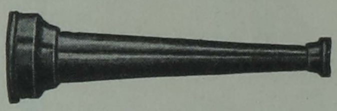


Threads on tips of all ¾ and 1-inch pipes are ⅜-inch iron pipe sizes. All ¾-inch nozzles and pipes are furnished with hose thread unless otherwise specified. All other sizes are furnished with iron pipe thread, unless otherwise specified.

Sizes ¾ and 1-inch packed in cartons.

Size In.	Per Doz.	Length In.	Size In.	Per Doz.	Length In.	Size In.	Per Doz.	Length In.
¾	**$7.00**	6	1¼	**$20.00**	12	2	**$50.00**	20
¾	**8.00**	7½	1½	**25.00**	13	2½	**75.00**	15
¾	**10.00**	12	1½	**30.00**	15	2½	**96.00**	20
1	**10.00**	8½	2	**38.00**	12	2½	**100.00**	24
1	**12.00**	12½	2	**45.00**	15	2½	**144.00**	30

Plain Hose Nozzles

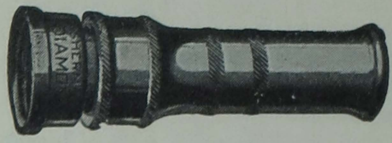


All ¾-inch nozzles and pipes are furnished with hose thread unless otherwise specified. All other sizes are furnished with iron pipe thread, unless otherwise specified.

Sizes ¾ and 1-inch packed in cartons.

Size Inches	Length Inches	Per Dozen	Size Inches	Length Inches	Per Dozen
¾	6	**$7.00**	1½	5¾	**$18.00**
1	4	**5.00**	1½	10	**20.00**
1	8	**9.00**	1½	12	**22.00**
1¼	4¾	**12.00**	2	12	**34.00**
1¼	10	**16.00**	2½	15	**65.00**
1¼	12	**18.00**	...	....	.....

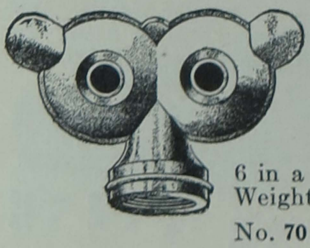
Diamond Spray Nozzles



Made in ¾-inch size only, hose thread.

Packed one dozen in a carton.

Price.......................................per dozen **$6.00**

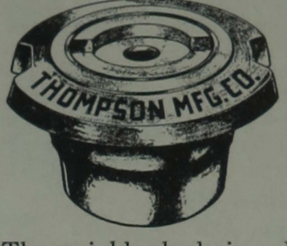


No. 70 Thompson Twin Hose Sprinklers

Delivers a fine spray over a large area. Threaded for ¾-inch standard hose coupling. Packed 6 in a carton, 6 dozen in shipping case. Weight per dozen, 8 pounds.

No. **70**....................per dozen **$4.20**

Thompson Adjustable Full-Circle Sprinkler Heads



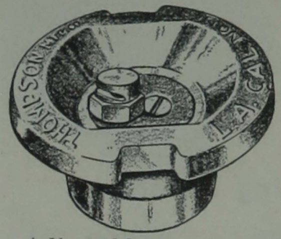
The brass lined body is die-casted from an alloy of zinc and copper, the nozzle-core accurately machined from brass rod. Regulation of discharge is made by screwing the nozzle up or down, without changing the character of the spray. The nozzle has built-in strainer and is easily removed for cleaning. The sprinkler body is cadmium-plated to prevent corrosion.

Made in 5 sizes: Special, for 10-foot spacing; A, for 12-foot spacing; B, for 14-foot spacing; C, for 16-foot spacing; D, for 18-foot spacing.

Packed 10 in carton; 100 in case. Weight, 51 pounds.

No. **115**, Threaded for ½-Inch Pipe..........per 100 **$75.00**
No. **116**, Threaded for ¾-Inch Pipe..........per 100 **75.00**

Thompson Half-Circle Adjustable Sprinkler Heads



Used along walks, next to buildings, in parkways, wherever it is desired to throw water in one direction only.

So designed that the body does not interfere with spray. Angle of spray is such that when head is installed at foot of terraced lawn, terraced area can be properly covered without tilting head.

Adjustable nozzle core. Die-cast of zinc.

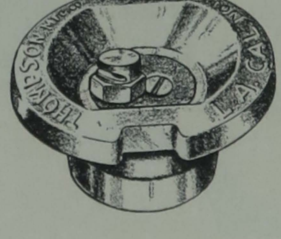
Can be furnished with two different nozzle sizes—3 and 5.

Packed 10 in carton, 100 in case; shipping weight, 44 pounds.

Also packed 50 in case; shipping weight, 22 pounds.

No. **140**, Threaded for ½-Inch Pipe..........per 100 **$75.00**
No. **141**, Threaded for ¾-Inch Pipe..........per 100 **75.00**

Thompson Quarter-Circle Adjustable Sprinkler Heads



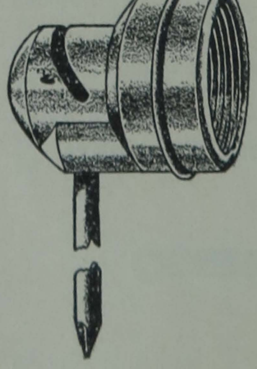
These heads have the nozzle cut for quarter-circle. They are used in corners formed by jogs in buildings.

Brass lined zinc die cast body. Copper and cadmium plated to prevent corrosion. Nozzle mounted in removable nozzle base with built-in strainer. Outside adjustment.

Packed 10 in a carton, 100 in a case; shipping weight, 44 pounds. Also 50 in a case; shipping weight, 22 pounds.

No. **142**, Threaded for ½-Inch Pipe..........per 100 **$75.00**
No. **143**, Threaded for ¾-Inch Pipe..........per 100 **75.00**

No. 165 Thompson Parkway Fan Hose Sprinklers



The No. 165 Parkway Fan is for use along the edges of sidewalks and driveways. It throws a fanlike spray over a long rectangular strip.

The spike is 4 inches long.

Threaded for ¾-inch standard hose coupling.

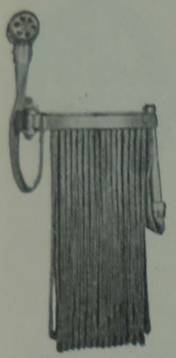
Packed 6 in a carton, 6 dozen in a shipping case.

Weight per dozen, 5 pounds.

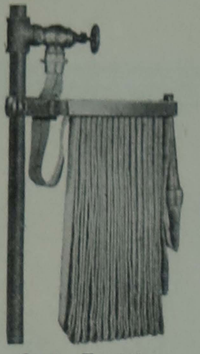
Price, No. **165**......per dozen **$3.60**

Bowes Hose Racks

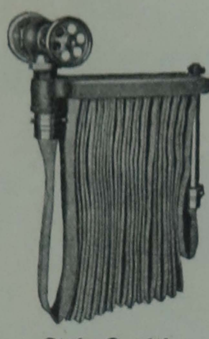
For Unlined Linen Hose



Style E with Wall Bracket



Style F with Pipe Clamp



Style G with Valve Nipple

The Bowes Rack consists of a tubular arm on which are slidably mounted eyeleted pins, supporting the folded hose. This gives a positive support; the pressure is equal on both sides, prevents pinching of the hose and holds it in place until the hose is withdrawn at the open end, the pins remaining on the extension arm. Rack has a cover; the hose cannot jam.

In ordering Style F racks, specify size of stand pipe.

Steel

No. Style E	No. Style F	No. Style G	Each Regular Finish	Each Nickel-Plated	Each Chromium-Plated	Capacity Feet	Hose Size Inches
30	40	50	$5.00	$7.00	$9.00	50	1¼
31	41	51	5.00	7.00	9.00	50	1½
32	42	52	5.00	7.00	9.00	50	2
33	43	53	5.00	7.00	9.00	50	2½
30A	40A	50A	5.50	7.50	9.50	75	1¼
31A	41A	51A	5.50	7.50	9.50	75	1½
32A	42A	52A	5.50	7.50	9.50	75	2
33A	43A	53A	5.50	7.50	9.50	75	2½
34X	44X	54X	6.00	8.00	10.00	100	1¼
34	44	54	6.00	8.00	10.00	100	1½
35	45	55	6.00	8.00	10.00	100	2
36	46	56	6.00	8.00	10.00	100	2½
34A	44A	54A	6.00	8.00	10.00	150	1½
35A	45A	55A	6.00	8.00	10.00	150	2
36A	46A	56A	6.00	8.00	10.00	150	2½

Brass

No. Style E	No. Style F	No. Style G	Each Regular Finish	Each Nickel-Plated	Each Chromium-Plated	Capacity Feet	Hose Size Inches
30	40	50	$10.00	$11.00	$13.00	50	1¼
31	41	51	10.00	11.00	13.00	50	1½
32	42	52	10.00	11.00	13.00	50	2
33	43	53	10.00	11.00	13.00	50	2½
30A	40A	50A	11.00	12.00	14.00	75	1¼
31A	41A	51A	11.00	12.00	14.00	75	1½
32A	42A	52A	11.00	12.00	14.00	75	2
33A	43A	53A	11.00	12.00	14.00	75	2½
34X	44X	54X	12.00	13.00	15.00	100	1¼
34	44	54	12.00	13.00	15.00	100	1½
35	45	55	12.00	13.00	15.00	100	2
36	46	56	12.00	13.00	15.00	100	2½
34A	44A	54A	12.00	13.00	15.00	150	1½
35A	45A	55A	12.00	13.00	15.00	150	2
36A	46A	56A	12.00	13.00	15.00	150	2½

Where the rack is swung from the valve, Style G, a pipe thread nipple is furnished without charge. For nipples with special threads the following net extra charge per rack applies.

Steel Nipples

Size Inches	Each
1½	$1.50
2	1.70
2½	2.00

Solid Brass Nipples

Size Inches	Each
1½	$1.70
2	2.00
2½	2.20

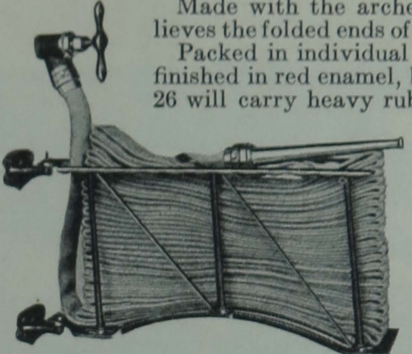
Where pipe clamps are specified, Style F, they are furnished up to and including 4-inch, without charge. For larger sizes there is a net extra charge per rack as follows:

Steel Clamps

Size.................inches	4½	5	6	7	8
Each..........	$.80	1.00	1.20	1.30	1.80

Hartford Swinging Hose Racks

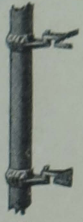
Approved by Associated Factory Mutual Ins. Co.



Made with the arched bedplate which relieves the folded ends of the weight of the hose.

Packed in individual wooden boxes. Stock finished in red enamel, baked on. Nos. 25 and 26 will carry heavy rubber-lined cotton hose in 50-foot lengths.

Furnished with clamps or wall brackets. In ordering state which is desired and if pipe clamps give the size of the pipe. Capacity of racks for linen hose is figured on hose with only one set of couplings. Where hose is coupled in two or more lengths, next larger size rack is required.



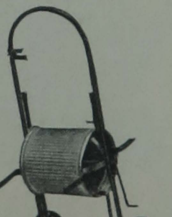
Pipe Clamps

Prices include pipe clamps up to and including 4-inch size. For larger size pipe clamps there is an extra charge.

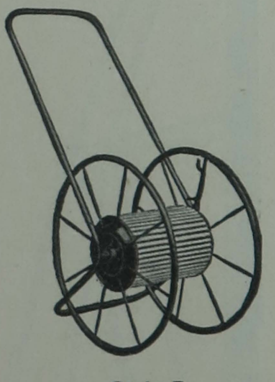
For Unlined Linen Hose

No. Style A Pipe Clamps	No. Style B Wall Brack.	Each	Cap. Ft.	Hose Size In.	No. Style A Pipe Clamps	No. Style B Wall Brack.	Each	Cap. Ft.	Hose Size In.
17H	017H	$5.00	50	1¼	21 A	021 A	$6.00	100	1¼
18H	018H	5.00	50	1½	21 H	021 H	6.00	100	1½
19H	019H	5.00	50	2	21½H	021½H	6.00	100	2
20H	020H	5.00	50	2½	22 H	022 H	6.00	100	2½
17A	017A	5.50	75	1¼	23 H	023 H	7.00	150	1½
18A	018A	5.50	75	1½	23½H	023½H	7.00	150	2
19AH	019AH	5.50	75	2	24 H	024 H	7.00	150	2½
20A	020A	5.50	75	2½	.....	......	....	...	...
For Cotton Rubber-Lined Mill Hose									
25H	025H	$7.50	50	1½	26H	026H	$8.00	50	2½
25½H	025½H	7.50	50	2	....	.....	....	..	...

Wirt & Knox Hose Reels



No. 2



Style B

No. 2 Hose Reels

An all metal reel, tubular frame, heavy galvanized sheet steel drum 9 inches in diameter, solid steel arms; capacity, 100 feet of ¾-inch rubber hose. Weight, 13 pounds.

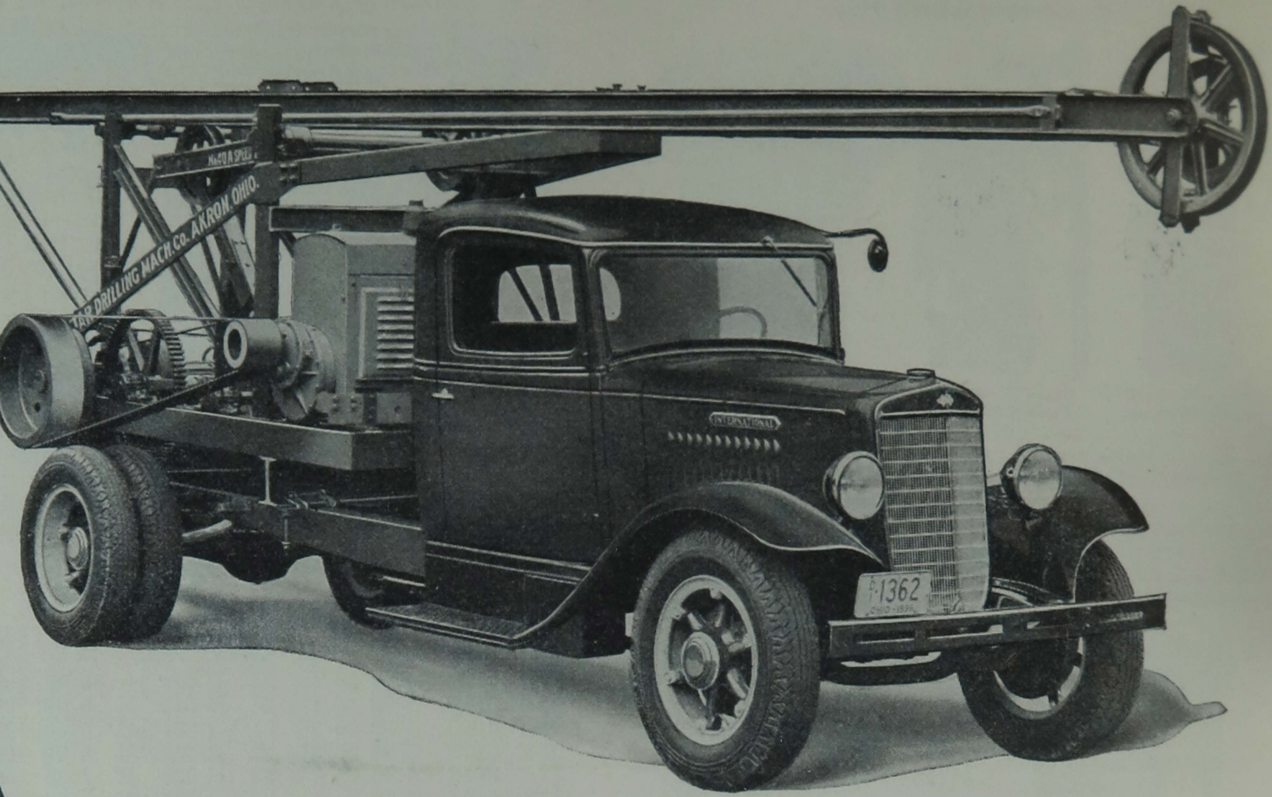
No. 2..each **$3.20**

Style B Tubular All Metal Hose Reels

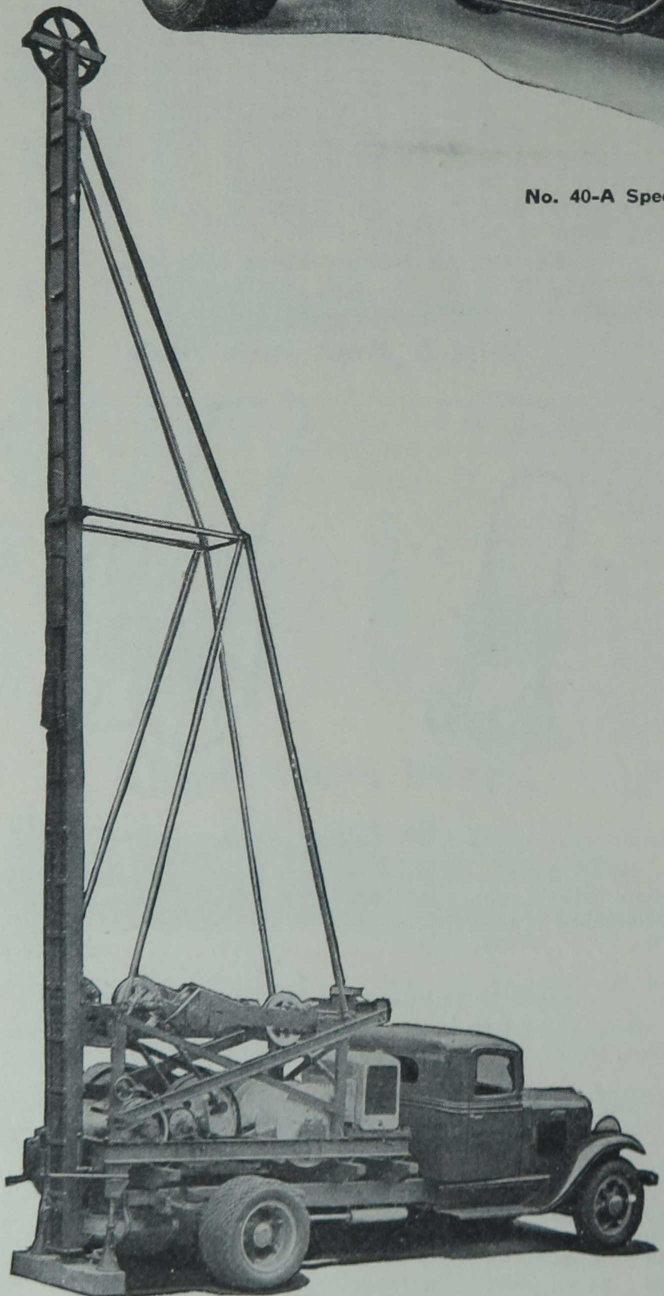
Nos. 10 and 20 have corrugated galvanized iron drums; Nos. 30, 34, 35 and 40 have sheet metal drums.

				Capacity, Feet					
				Rubber Hose Diam., In.			Cotton Rubber Lined Hose Diam., In.		
				¾	1	1¼			
				No. of Plies					
No. Reel	Each	Hght. Reel In.	Wt. Lbs.	3	4	4	1¼	1½	2
10	$4.80	21	15	100	50	...	...	...	...
20	5.40	24	17	150	75	...	...	...	...
30	8.65	29	34	400	150	100	200	150	100
35	15.90	32	50	600	250	200	400	300	200
40	27.50	34	66	800	300	250	500	400	300

Star Water-Well Drilling Machines



No. 40-A Speed Star Ready to Move



No. 71-A Speed Star

No. 40 Speed Star

A light weight, all-steel portable well drilling machine, designed primarily to use manila cable. Conservatively rated capacity, 300 feet with 1000 pounds of tools. All steel electric welded construction and a structural steel mast.

This machine is adaptable to the hydraulic or jetting systems and will handle 500 feet of 2-inch hole with hollow rod tools. It is most advantageously designed for shallow well drilling, structure or foundation testing, geophysical prospecting or shallow blast holes.

No. 71 Speed Star

This machine was built to meet the demand for a portable, rugged wire-line outfit with a conservative capacity of 600 feet handling 1600 pounds of tools.

It is ideal for drilling shallow large diameter wells or for hard rock formations when heavy tools must be used. Features include shockless spudder, chain driven bull reel, V-belt drive, telescoping mast and 27 anti-friction bearings.

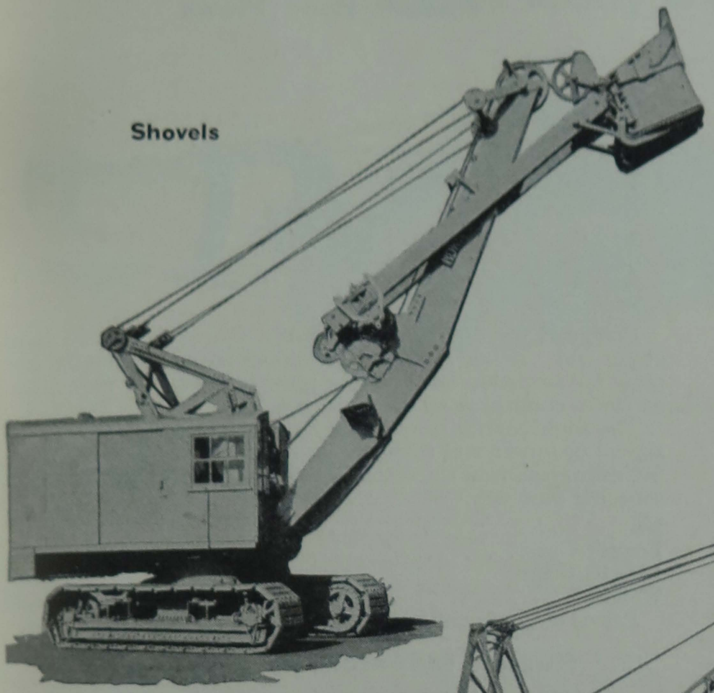
To meet various drilling and moving conditions, both No. 40 and No. 71 Speed Stars are offered in the following styles: Model A, for mounting on truck; Model P, trailer model with pneumatic tires; Model R, trailer model with solid rubber tires; and Model W, trailer model with steel wheels.

Northwest Contractors' Equipment

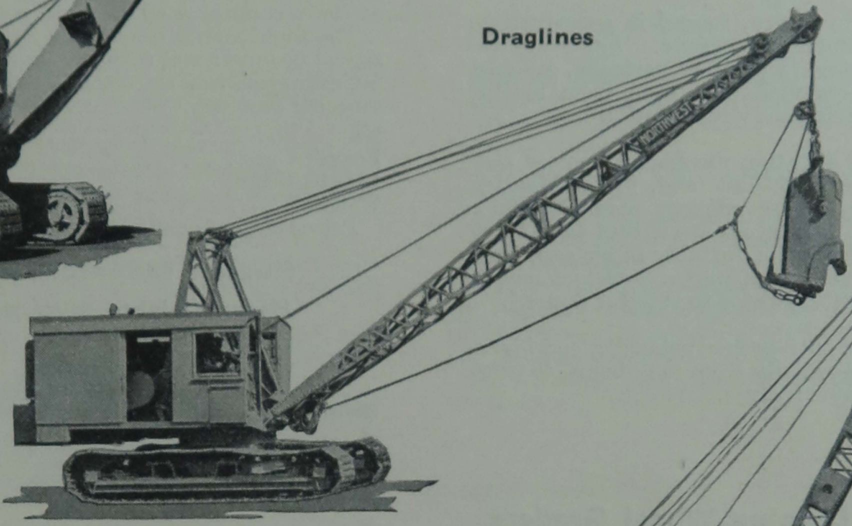
Built in a Range of 15 Sizes
$\frac{3}{8}$-Yard Capacity and Larger

Gasoline, Oil, Diesel or Electric Power

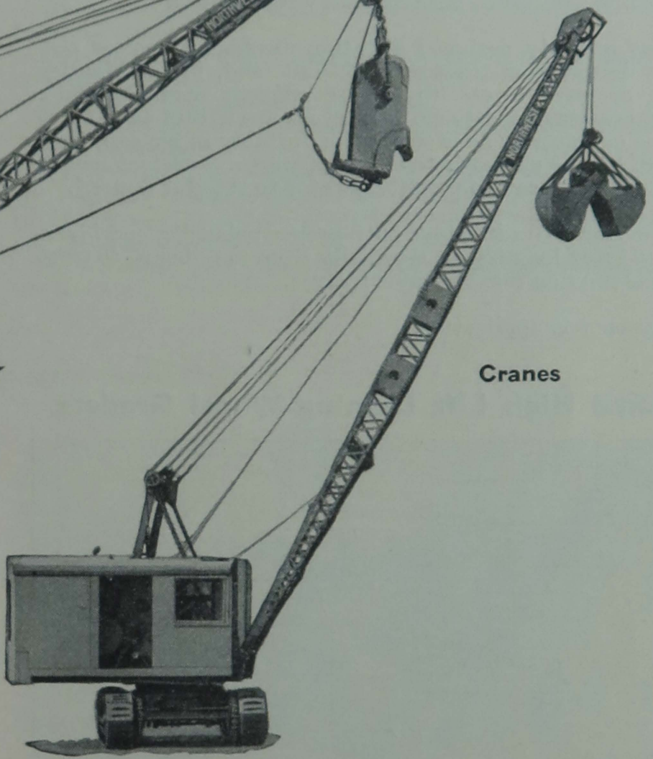
Shovels



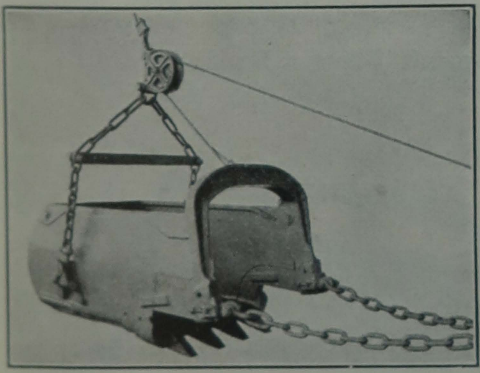
Draglines



Cranes

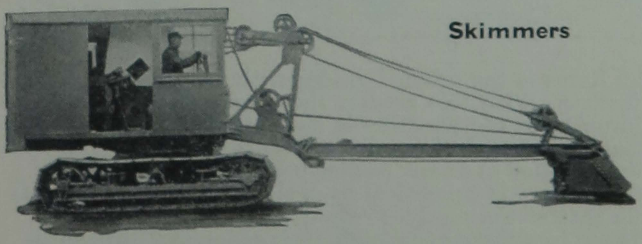


Dragline Buckets

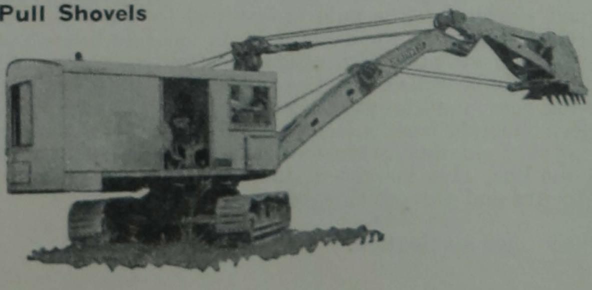


The Northwest Dragline Bucket has not only made greater yardage possible with the dragline, but it brings the quality and strength that only high grade steels can give. It assures extra yardage without constant rebuilding.

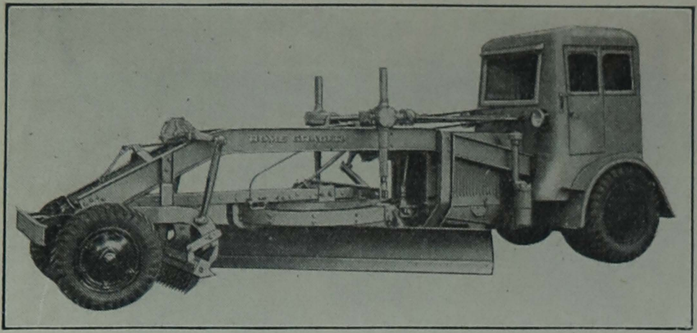
Skimmers



Pull Shovels



Rome Motor Graders



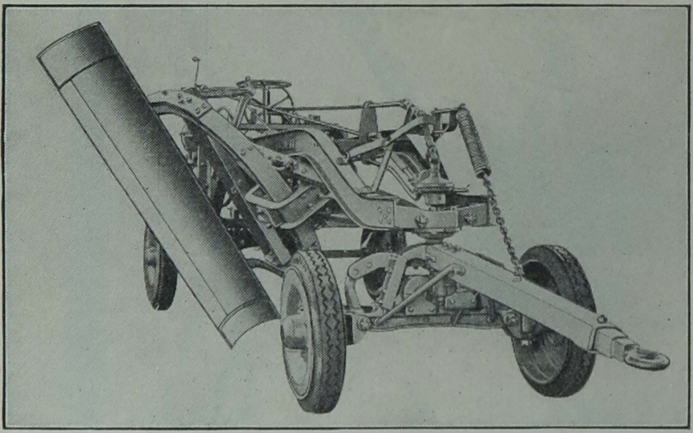
This grader is simple in design, rugged in construction, easy to handle and economical to operate. For every variety of road work—leveling, scarifying, scraping, grading, ditching, rooting, snow removal, etc., etc.—from tearing up old pavements to bucking heavy snow drifts.

Has properly designed 5-station mechanical power controls driven from tractor crankshaft, and, in combination with enclosed screw lift, insure efficient operation under most exacting conditions. All levers are within easy reach of the operator as he is seated comfortably in his cab, from which he has unobstructed view of work. Sufficient height is provided in cab to permit operator to stand if desired.

The Rome Grader stays put—proper balancing and leverage of extra long frame, especially from moldboard to front wheels provide this desirable feature.

Prices upon application.

Rome High Lift Leaning Wheel Graders

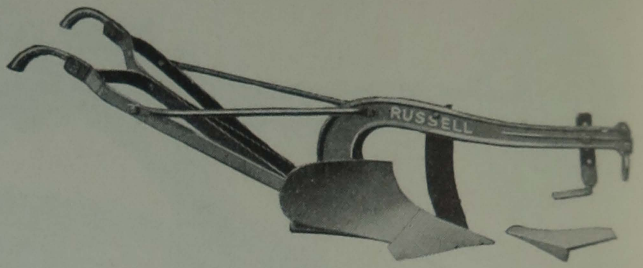


The Rome is the original grader with the patented high lift feature. With this grader, the operator stands on his platform, turns the handwheels and sets the moldboard at any angle he chooses, or easily adjusts it from a ditching or grading position to a bank cutting position almost instantly. The moldboard is a practical bank sloper in itself, an inseparable part of the machine—right at the operator's hand. Blade can be adjusted to a high lift position in a jiffy, without the use of wrenches or any other tools.

Regardless of the position of the tractor, this grader travels in a straight line—follows the direction of draft without skidding. The pole is fastened to the fifth wheel directly in line with the draw bars, is securely braced, and forms a unit with the fifth wheel and the front axle. Axle turns as pole is turned, but the wheel spindles, operated by steering gear, maintain their position at right angles with grader. Thus the front wheels, traveling parallel with frame, do not skid sideways. Moreover, the wheels, running in a straight line, give increased clearance between wheel and moldboard and prevent clogging.

Prices upon application.

Russell Road Plows



Designed for all-around work for 4 or 6 horses in hard stony soil. Being all steel, it makes an exceptionally fine plow for township use where a plow is used only part time, as there is nothing to decay or rot.

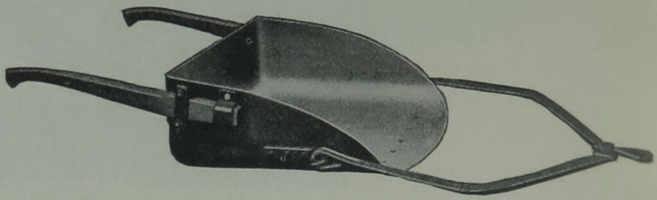
The moldboards have a very moderate turn and are designed to loosen soil rather than to turn it over. The moldboards are made of the strongest quality plow steel with good scouring qualities.

No.		5	6
Length Cut	in.	10	12
Length Beam	in.	42	50
Weight	lbs.	200	210

Prices of plows and extra shares upon application.

Russell Monarch Drag Scrapers

Heavy Weight—With Handles on Side



The pan is formed from one piece without heating. The corners are well lapped; hot riveted. Double bottoms are furnished. The extra bottom is bulged and is riveted to the scraper in the side flange. The bottoms are of one gage heavier plate than the pans. The heavy bails have a swivel for the hitch. The swivel hitch permits the scraper to be dumped sideways. The ears for attaching bails are well riveted to the pan.

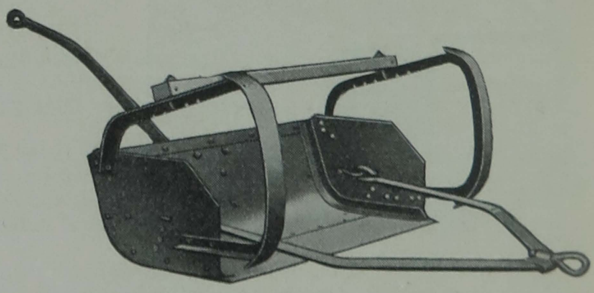
Handles are well shaped and made from hardwood.

No.		1	2
Capacity	cu. ft.	7	5
Weight	lbs.	125	105

Prices upon application.

Russell Fresno Scrapers

Standard Pattern



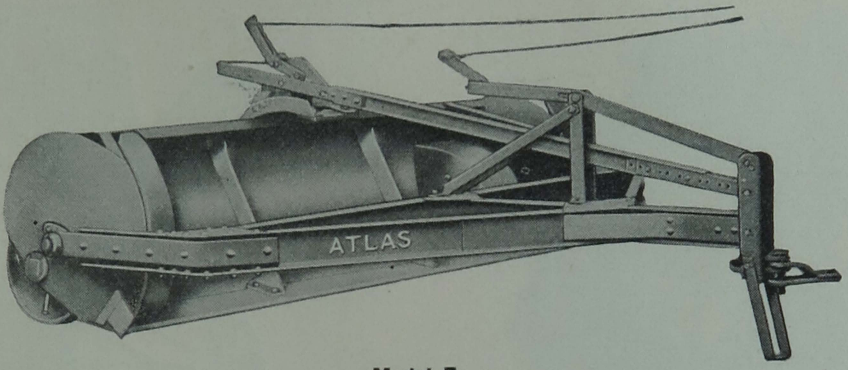
Made of high carbon steel, hammered cutting edge, patented Johnson bar held fast by a malleable casting. All parts under heavy strain are hot riveted.

The 3½-foot size is furnished regularly with steel bails as illustrated, or can be furnished with evener woods and draft links if desired. May also be had in heavy pattern.

Length	ft.	2½	3	3½
Capacity	cu. ft.	6	8	10
Side Runners	in.	3x⅜	3x⅜	3x⅜
Weight	lbs.	185	215	230

Prices upon application.

Atlas Rotary Wheeled Scrapers



Model F

The Atlas Scraper will work any tractor—no special attachment or mechanical changes are necessary. Two ropes attached to operating levers and leading to driver's seat, control every function. The front lever controls the digging position and the rear lever trips the stop, allowing the bowl to rotate. Three stops are mounted on curved members at the center of the bowl.

The rotary wheeled scraper is sturdily constructed.

The frames are made of rolled structural steel shapes, bars and plates, and are both riveted and electric arc welded, thus assuring double strength.

The bowls are made of heavy steel plate and shapes, well braced, heavily welded throughout. This forms an extremely strong, rigid unit.

The control bars, levers and links are made of heavy steel sections.

Cutting blades are special alloy high carbon plow steel.

Axles are chrome nickel steel, heat-treated.

The parking stand at the front makes coupling and uncoupling easier.

All castings are either high quality cast steel, manganese, or tough gray iron.

Alemite lubrication to all bearings.

The Atlas center control eliminates twists and torsional strains in the bowl.

Every scraper is tested behind a tractor before leaving the factory. Atlas machines are guaranteed to be exactly as represented and to do properly the work for which they are recommended.

All parts are fully guaranteed against defective materials or faulty workmanship.

Model AB, for Standard Service

The standard duty Model AB rotary scraper is especially recommended for all kinds of dirt moving and is very popular in agricultural work. It is built strong to withstand long, hard service. The materials are carefully selected from new, domestic stock.

The bearings are cast iron renewable boxings for all sizes.

The wheels are heavy duty spoked type with hub caps and dust guards. They are 32 inches in diameter, with a 6-inch concave rim.

Model	Bowl Width Ft.	Approx. Max. Moving Capacity Cu. Ft.	Tractor H.P. Recommended	Approx. Weight Lbs.
4-AB	4	30	15 to 20	1100
5-AB	5	35	15 to 20	1200
6-AB	6	40	20 to 30	1580
7-AB	7	50	30 to 35	1650

Model C, for Heavy Service

The heavy duty Model C rotary scraper is especially recommended for use where large quantities of dirt are to be moved. It is built strong to withstand heavy service. The materials are carefully selected from the best, new, domestic stock.

Bearings are cast iron renewable boxings for the 5C and 6C. For the 7C, 8C and 10C, Timken roller bearings are used.

Wheels are heavy duty spoked type with hubs to suit the above bearings. They are 32 inches in diameter with a 6-inch concave rim. They may also be secured with a flat, deep grooved rim at a slight additional cost.

The spreading shoes are special alloy plow steel, heat-treated.

Model	Bowl Width Ft.	Approx. Max. Moving Capacity Cu. Ft.	Tractor H.P. Recommended	Approx. Weight Lbs.
5C	5	40	20 to 30	1500
6C	6	50	25 to 40	1750
7C	7	60	30 to 45	2200
8C	8	75	40 to 50	2400
10C	10	100	50 and up	2800

Model F, for Extra Heavy Service

The extra heavy duty Model F rotary scraper is especially recommended for use in general excavating, road construction, gravel pits, forest service, irrigation work or wherever a scraper is needed to handle a hard job.

The materials used are of high quality and the extra rugged construction will withstand many a tough, hard job.

Wheels are extra heavy drummed type, 8 inches wide for 5F and 6F, 10 inches wide for 7, 8 and 10F. The wheels are set into the back of the bowl, thus eliminating interference and giving the axles two point suspension instead of cantilevered.

Two Hyatt roller bearings are in each wheel, together with suitable spacers and dust-tight seal rings.

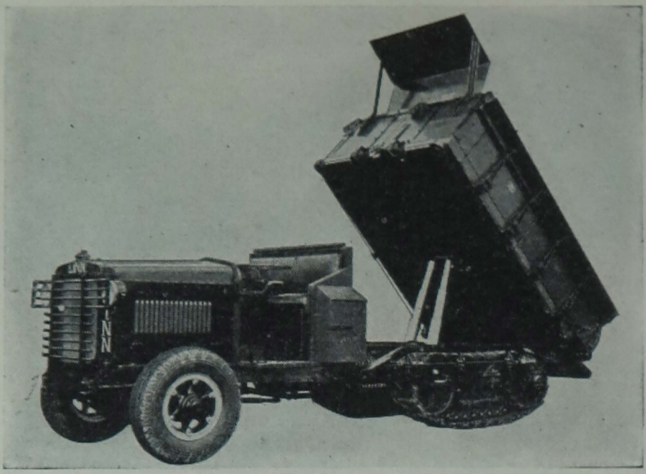
Another feature is a simple device whereby the load can be dumped backwards or forwards and the load can be carried forwards or backwards on wheels anywhere.

A further feature is the adjustable, automatic digging control lever. This can be adjusted to break the bite of the blade when a certain amount of soil has been excavated.

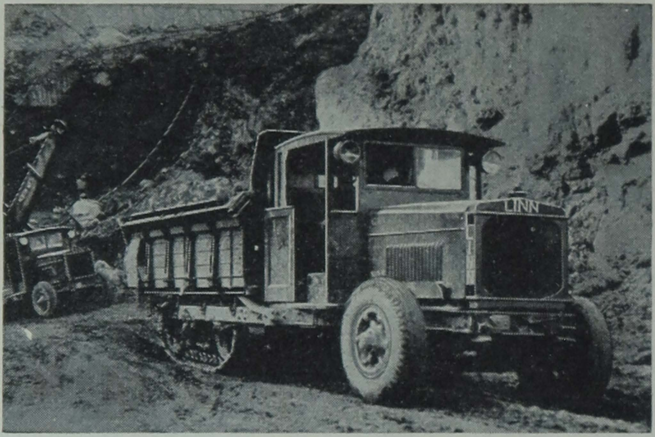
Spreading shoes are special alloy plow steel, heat-treated and reversible.

Model	Bowl Width Ft.	Approx. Max. Moving Capacity Cu. Ft.	Tractor H.P. Recommended	Approx. Weight Lbs.
5F	5	37	20 to 30	1800
6F	6	47	25 to 40	2000
7F	7	57	30 to 45	2400
8F	8	72	40 to 50	2800
10F	10	97	50 and up	3000

Linn Tractors



Tractor



Tractor in Operation at Bonneville Dam

This tractor combines massive power, sure-footed traction and huge payload capacity—yet it operates like a truck, with the conventional steering wheel, clutch, etc.

Its outstanding feature is the patented Linn Flexible Traction Unit which compensates at all times for any unevenness in the ground, or for rocks or stumps over which the tracks must negotiate. Thus they have full ground contact at all times, eliminating slippage and providing perfect traction regardless of the footing or the weather.

This compensating mechanism is so designed that it automatically takes up for wear—and prevents ice, snow, mud or rocks from clogging between sprockets and tracks. Every part subject to wear is made from 12 per cent Manganese steel which resists severest usage and assures long, satisfactory service.

Carries a huge payload in durable bodies, also tows loaded trailers. For use in road, dam and other construction, logging, mining, quarrying, snow plowing, etc.

The rugged body of huge capacity has automatic downfold tail gate and flare boards. Steel cab protector.

The under-body hoist is 3-sleeve type, 57 degree dumping angle. Dumps while moving in either direction.

Four speeds each way are available—high speeds, forward and reverse. Reverse driver's seat with complete controls for reverse driving.

Balloon tires and ball bearing steering gear; can also be equipped for sled steerage.

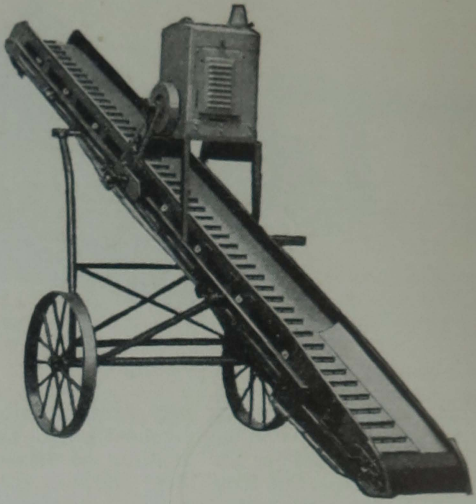
Wide tracks enable this tractor to run to edge of dump; no bulldozing necessary.

Furnished and powered with high torque, 4 or 6-cylinder gas engines, and with the proved 6 cylinder Linn-Cummins Diesel engine. The Diesel motor starts from battery.

Capacity of standard body, 8 to 9 yards.

Prices upon application.

Model 343 Porta Trough Conveyors



Recommended for handling sharp or abrasive materials and fine or powdery materials such as crushed stone, sand, gravel, fine coal, chalk, sulphur, etc. Will also handle small bags and bundles.

This conveyor has a low feed end which makes it most efficient for unloading hopper bottom cars or for use wherever conveyor must be fed by hand. Low feed end permits scraping material to carrying belt instead of lifting it by shovelfulls to a feed hopper. Can be mounted on plain steel wheels, on rubber tired wheels with spring shock absorbers for towing behind a truck or it can be mounted on an automobile chassis.

Belt.—While weight of duck (28 pounds), friction (22 pounds minimum) between 4 plies and tensile strength of cover (2000 pounds minimum) are comparable with transmission and standard conveyor belts—the edge construction, width tolerance, cover compound, etc., were arrived at only after exhaustive operating tests to ascertain the best possible belt construction for maximum life on a portable through type conveyor.

Frame.—Constructed of $\frac{3}{16}$-inch steel angles and flats, well braced, assuring rigidity. Multiple holes and bolts provide facility in making repairs and in relocating existing attachments or fastening new ones.

Troughing Rollers.—3-unit troughers with oilless bearings are standard.

Lagged Head Pulley.—Prevents belt slippage, regardless of weather or load.

Tail Pulley.—Completely filled with grease, forced in through shaft and out at bearings. Prevents dirt and grit from working into bearings.

Scraper Plate.—Furnishes a sturdy support for belt at receiving end and prevents accumulation of material around tail pulley by causing it to be quickly and automatically delivered to clean-out opening.

Bottom Cover Plate.—Prevents possibility of return belt carrying lumps to feed end and jamming; completes strong box-like construction of feed end.

Bearing Blocks.—Provide a large grease reservoir; Alemite lubrication; bronze bearings.

Sprockets.—Hyten steel is used for 10 to 15 tooth; larger sizes are semi-steel. All cut teeth, tapped for set screw; 2-inch hubs.

Chain.—All drive chains are $\frac{3}{4}$-inch pitch, heavy duty finished steel roller chain.

Chain Idlers.—Stationary and adjustable; shafts bored and fitted with Zerk fittings.

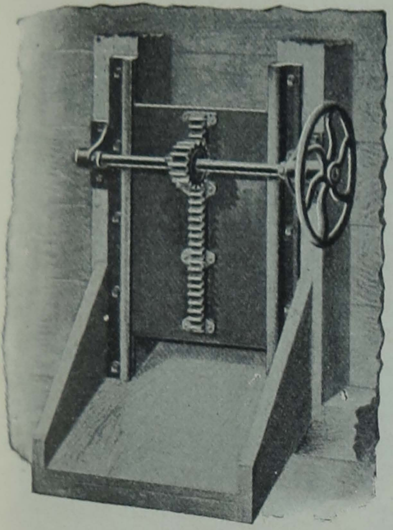
Wheel Truck.—$1\frac{1}{2}$-inch extra heavy steel pipes, well braced, malleable tees; $1\frac{11}{16}$-inch cold rolled steel axle; roller bearing wheels, 42-inch diameter by 4-inch face; 2-inch pipe and 54-inch diameter by 5-inch face wheels are used on 35 and 40-foot lengths.

Mast type truck with power raise furnished if specified.

Capacities, 18-inch width, 60 yards per hour; 24-inch width, 90 yards per hour.

Prices upon application.

Standard Rack and Pinion Ore Bin Gates

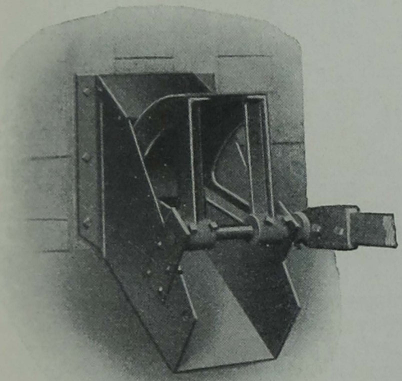


The rack and pinion ore bin gate is used for side discharge. It is particularly convenient where clearance is limited or the close control of the flow is necessary. It is substantially built and may be relied upon for excellent service even where coarse, abrasive material is handled.

It consists of steel plate doors, steel shaft, cast iron guides, hand wheel, solid cast bearings for hand wheel shaft, rack and pinion.

No.	Width Gate In.	Height Gate In.	Weight, Pounds 1 Rack and Pinion	Weight, Pounds 2 Racks and Pinion	No.	Width Gate In.	Height Gate In.	Weight, Pounds 1 Rack and Pinion	Weight, Pounds 2 Racks and Pinion
1	18	24	160	180	**4**	24	30	220	250
2	20	24	170	190	**5**	24	36	230	270
3	20	30	190	220	**6**	30	36	250	300

Telsmith Siquad Bin Gates



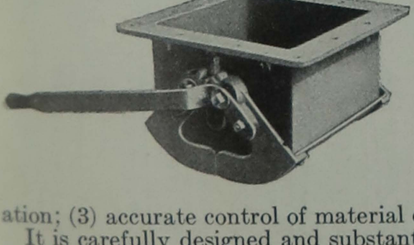
This is an overcut gate, closing downward on the flow of stone, and can be rigged for operation from any point above or below the gate. Works easily, and the flow of stone is accurately controlled. Easily made watertight for use on sand bins in gravel washing plants.

Big tonnages can be discharged rapidly.

The valve segments are cast iron with the valve face plate mild steel. Guaranteed for satisfactory wear on very coarse abrasive materials. Furnished with 6¾-foot truck-loading chute or with 9¼-foot carloading chute. If preferred, gate can be furnished with fixed chute only.

Size Bin Gate............in.	12x18	16x18	20x18	24x18
Thick. Metal in Chutes....in.	3/16	3/16	¼	¼
Wt., with Truck-Loading Chute.....lbs.	345	550	595	690
Wt., with Car-Loading Chute.......lbs.	430	650	720	815
Wt., with Fixed Chute Only.lbs.	146	185	210	235

Duplex Bin Ore Gates



Designed for rapid bottom discharge, operated by a single lever, by means of gear teeth on the valve jaws.

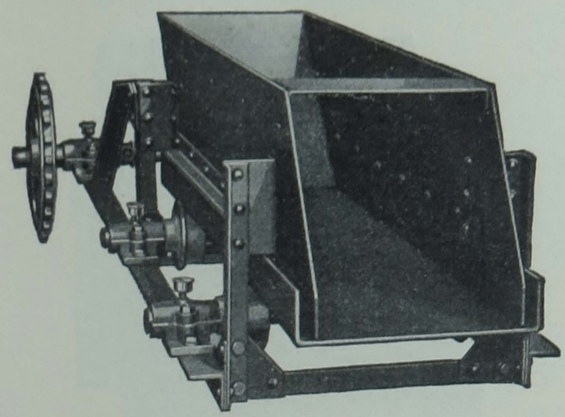
This gate has 3 main advantages: (1) big openings; (2) ease of operation; (3) accurate control of material discharged.

It is carefully designed and substantially built.

Size of Gate..................inches	12x12	16x16	20x20
Approximate Clearance Required ....inches	11	14	17
Approximate Weight........pounds	130	180	280

Prices upon application.

Telsmith Plate Feeders



This feeder will take stone or gravel from a steam shovel, clam shell, dragline bucket or dump car, delivering the material at a fixed rate all day long.

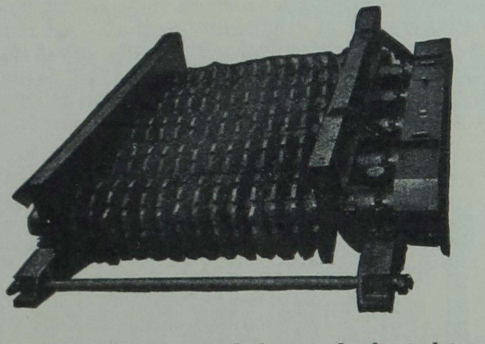
Feeder consists of flat pan, resting on four rollers, and actuated by a cam and connecting rod, discharging the material from the end of feeder in a very steady stream. Tonnage delivered can be regulated closely by changing either speed or stroke or both. An eccentric is provided, internal of the cam, to change the length of stroke.

Width Feeder Plate In.	Length Standard Feeder Plate Feet	Approx. Cap. 6-In. Stroke, 50 R.P.M., Cu. Yds. per Hr.	Power Required H. P.	Weight Complete Feeder Pounds
16	5	50	1¼	1100
20	5	80	1½	1115
24	5	115	2	1280
***30**	5½	175	3	1700
***36**	6	250	5	2870

*Equipped with two eccentrics and connecting rods.

Prices upon application.

Robins Cataract Grizzly Screens



This screen is made in several sizes and adapted to screening materials where the sizes of the fines or throughs are between ¾-inch and 3-inch.

It has a large capacity, requires very little space and its power consumption is small.

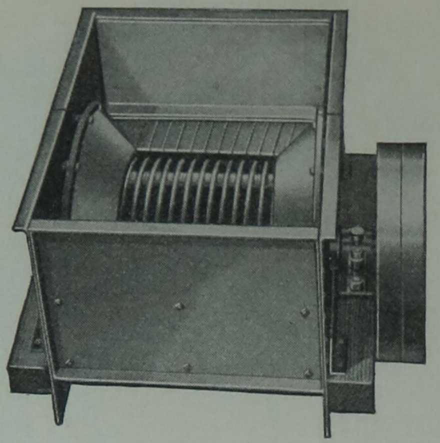
This grizzly consists of a series of parallel shafts, carrying rows of discs which dovetail with discs on adjacent shafts. The openings between the peripheries and hubs of the discs form the size of mesh or screen opening.

The several shaft outfits are mounted on cast iron side frames, rigidly held together with cast iron spacers, making the grizzly a self-contained unit which can easily be installed. As these shafts are all connected by chain and sprocket transmissions and rotate in the direction in which the material travels, the successive rows of discs gently roll the material along. The fines drop through the spaces between the disc and the oversize material is delivered off the lower end of the grizzly.

This screen is chiefly used in the sizing of coal and coke.

Prices upon application.

Telsmith Grizzlies



If fine aggregate is run through a crusher, it will fill the voids in the crushing bowl, block the discharge opening and wreck the machine. To safe-guard the crusher against this danger, it is recommended that the fines be by-passed around the crusher by means of a grizzly.

The grizzly is made of special bars. The lower half of the bar is made thinner than the upper part. As ample clearance is provided at the bottom of the bar, the stones are not likely to lodge between the bars. The sliding stone wears the bevel edges of the bar quite uniformly—merely rounding off the upper edge so that the screen is effective until the upper half of the bar is almost worn away.

Scalping frequently is a problem, particularly when small aggregate (minus 1–1½-inch) must be removed from a large tonnage. The rotary grizzly will prevent clogging in most cases. This grizzly consists of a rotary drum, carrying round bars mounted between two end castings. In assembling this device, one of the end spiders is keyed to the shaft. The other disc is left unkeyed to the shaft, until the whole drum is assembled. The loose disc is then twisted around and keyed slightly out of alignment, so that the bars, rings and spacers, have a slight spiral movement. Most of the undersize aggregate falls directly through the cylinder. Such pieces are caught inside cylinder travel endwise and are discharged from end of cylinder.

Specifications

No.	Diam. Rotor In.	H.P. Req.	Speed Rotor• Shaft R.P.M.	Size Std. Rings In.	Diam. Rotor Shaft In.	Thick. Steel Casing In.	Max. Size Material In.	Wt. Complete Lbs.
30	30	2	28	⅞	2 7/16	3/16	4	1780
36	36	2½	22	⅞	2 15/16	¼	5	2800
360	36	2½	22	1¼	2 15/16	¼	8	3100
450	45	5	16	1¾	3 7/16	⅜	12	7000
540	54	7½	12	2¼	3 15/16	½	16	15000

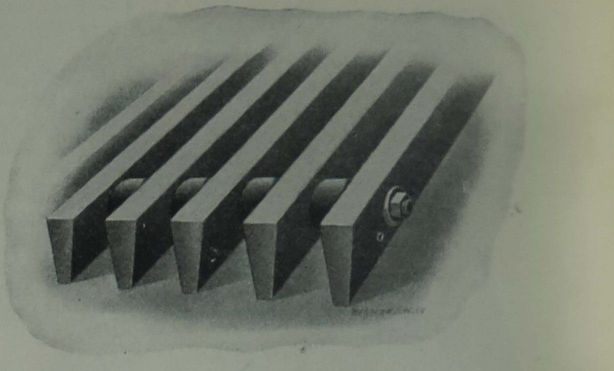
Capacities

Open. In.	Approx. Capacity, Cubic Yards				
	No. 30	No. 36	No. 360	No. 450	No. 540
1½	40	60	...	...	...
2	55	100	100	...	...
2½	65	125	125	180	...
3	..	...	150	220	300
4	..	...	175	250	350
5	..	...	...	280	400
6	..	...	...	300	450

Bars

Dist. Cen. to Cen. Bars. In.	Width Open. Bet. Bars In.	Wt., Lbs. per Sq. Ft. Grizzly Wedge Bar 1x4-In.	Dist. Cen. to Cen. Bars In.	Width Open. Bet. Bars. In.	Wt., Lbs. per Sq. Ft. Grizzly Wedge Bar 1x4-In.
2	1	..	**4**	3	26
2½	1½	..	**5**	4	24
3	2	34	**6**	5	22
3½	2½	30	..	..	..

Grizzlies

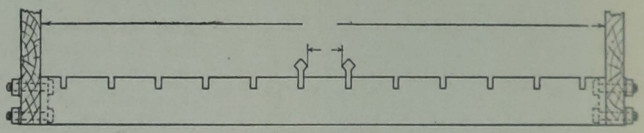


Style No. 1

The ore is delivered on the Grizzly as it comes to the mill, and the finer particles pass through the bars into the ore bin, thus saving a certain amount of work of the crushing machinery.

In Style No. 1 the bars are punched and held in place by steel rods passing through the holes. Cast iron spacers of the proper shape and width are placed between the bars.

Space Between Bars Inches	Wt., Lbs., per Sq. Ft. Bar 51 ½x¼x1¾-inch	Bar 52 ⅝x5/16x1¾-inch	Bar 53 ¾x⅜x2-inch	Bar 57 ¾x½x3-inch	Space Between Bars Inches	Wt., Lbs., per Sq. Ft. Bar 51 ½x¼x1¾-inch	Bar 52 ⅝x5/16x1¾-inch	Bar 53 ¾x⅜x2-inch	Bar 57 ¾x½x3-inch
½	30	31	40	63	**1¾**	16	17	22	..
¾	26	27	36	55	**2**	15	16	18	36
1	22	23	29	49	**2½**	14	15	16	..
1¼	19	20	27	43	**3**	13	14	14	..
1½	17	18	24	40	...	..	..	..	..



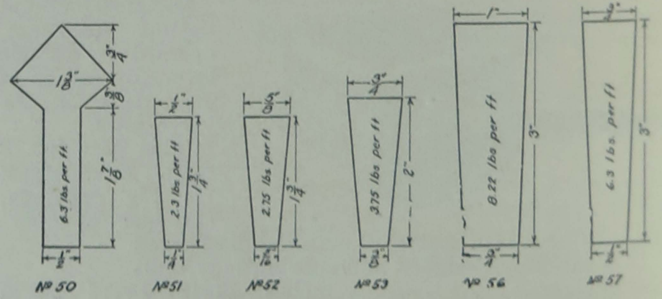
Style No. 2

In Style No. 2 Grizzlies, the bars are supported on rests of steel or cast iron; the upper edges of which are notched out at proper intervals and of the proper shape to receive the Grizzly bars. At the lower end of the Grizzly, the Grizzly bars are notched to receive a holding-down bar. This gives the Grizzly a smooth surface over the entire length.

Weights shown in the following table are based on steel rests.

Space Between Bars Inches	Weight, Pounds per Square Foot				
	Bar No.				
	50	**51**	**52**	**53**	**54**
	Size Rests, Inches				
	¾x5	⅝x4	⅝x4½	⅝x5	½x3½
½	49	31	32	41	16
¾	42	30	29	38	14
1	38	25	26	31	11
1¼	35	22	23	28	9
1½	32	19	20	25	8
1¾	30	18	19	23	..
2	28	16	17	21	..
2½	25	15	16	19	..
3	23	13	15	18	.

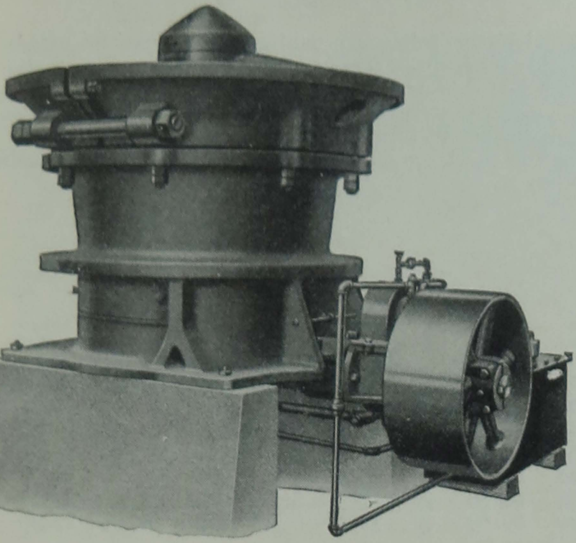
We make Grizzlies in any size and weight specified. Prices upon application.



Standard Grizzly Bars

We can furnish Grizzly bars in any of the shapes illustrated. Prices upon application.

Telsmith Primary Breakers



This breaker is guaranteed against breakage even by tramp iron. The fixed shaft is held rigidly at top and bottom by expansible taper bushings.

The long sleeve eccentric rotates on fixed shaft. The crushing cone gyrates horizontally. The crushing pinch is as long at top of head as at bottom of bowl. Exerts full stroke on big chunks just as they enter crusher.

The low-arched, heavily metallic crown and the short frame with thick walls and big ribs are made of steel.

Self-tightening manganese steel mantle, gun-lock type.

Cut steel drive gears, practically noiseless; run in oil bath. The self-priming, internal-gear pump is driven by cut spur gears, enclosed and running in oil. All bearings in crusher are lubricated by force-feed.

Removable countershaft has tapered roller bearings, automatic lubrication and sight feed. No outboard bearing required. Crusher has large oil tank with ample cooling capacity. Screen filter and baffles deposit fine grit. Bottom plug allows easy drainage and cleaning.

Clean discharge through 3-arm bottom spider. Discharge chute independent of crusher structure, attachable in any position. No right or left-hand drive. Discharge area should always be sufficient to permit free escape of crushed rock. Maximum safe reduction ratio, 6–1; on extremely hard rock it is advisable to make the reduction ratio 5–1. Fine rock, dirt and sand must be removed from feed to crusher by grizzly or scalping screen.

Specifications

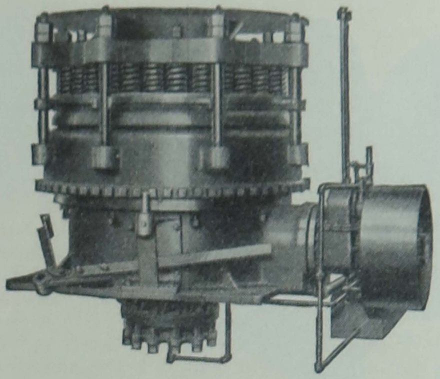
No.	Receiving Openings —Inches— Size Each	Receiving Openings —Inches— Approx. Size Both	Crated for Export Approx. Wt. Lbs.	Crated for Export Contents Cu. Ft.	Driving Pulley —Inches— Diam.	Driving Pulley —Inches— Face	Driving Pulley —Inches— Box	Driving Pulley R.P.M.	*H.P. Required	Size Elevator Req. for Crusher Output Only
6B	6¾x35	6¾x70	10000	180	20	10	2⅞	750	15–20	3
8B	8x41	8x82	12000	200	20	12	2⅞	750	20–25	4
10B	10x51	10x102	19600	325	24	12	3⅜	700	25–30	5
13B	13x59	13x118	29000	450	30	14	3⅜	560	40–50	6
16B	16x74	16x148	47700	750	36	16	3⅞	500	60–75	7
20B	20x88	20x176	67500	900	40	20	3⅞	440	75–90	8
25B	25x106	25x212	108000	1300	40	24	4⅜	480	100–125	9

*Capacities

Disch. Open. In.	Hourly Capacity, Tons No. 6B	No. 8B	No. 10B	No. 13B	No. 16B	No. 20B	No. 25B
1	18–20	.....	.....	......	....	....	....
1¼	20–23	30–33	.....	......	....	....	....
1½	23–26	33–36	38–44	......	....	....	....
1¾	.....	36–40	44–50	......	....	....	....
2	.....	.....	50–57	70– 80	....	....	....
2½	.....	.....	.....	80– 90	120–135	....	....
3	.....	.....	.....	90–100	135–145	200–220	300–330
3½	.....	.....	.....	......	145–160	220–250	330–365
4	.....	.....	.....	......	....	250–280	365–400

*Where no rating is specified, for any certain discharge opening, crusher cannot be operated economically at that opening. The above capacities are based on stone, weighing loose about 2600 pounds per cubic yard and having a specific gravity of 2.6.

Telsmith Gyrasphere Crushers



The purpose of the gyrasphere is to assure more cubical aggregate, containing fewer oversize slabs and splinters.

Designed for unregulated and unlimited choke feed. The heavy steel hopper and large unobstructed feed opening facilitate handling of slabby material without bridging.

The large feed opening and spherical crushing surfaces permit unobstructed and unlimited choke feed. Continuous flow of aggregate over spherical shaped crushing head assures maximum number of crushing pinches at varied angles of thrust with consequent elimination of oversize flats and splinters.

Springs are assembled in self-contained unit, protected by feed hopper. Crushing members are manganese steel. Concave bowl is spring retained. Flexible leather labyrinth seal rings prevent entrance of grit and water.

Gyrasphere is readily adjustable to meet a wide range of sizing requirements. Adjusting mechanism is at convenient point on outside of machine, away from crushing zone and sealed against entrance of water or dust. As springs are interposed between adjustment and crushing members, adjusting screws are protected against unusual crushing shocks.

Main frame, adjusting collar and concave bowl (entire outer structure) are steel castings guaranteed against breakage, even by tramp iron. Drive gears are cut steel, running in oil.

Discharge is by gravity, through 3-arm bottom spider; spider arms are protected by steel shields. Discharge chute is independent of the crusher structure; and may be attached at any desired position.

The self-priming internal gear pump is driven by cut spur gears enclosed and running in oil. All bearings in crusher are lubricated by force-feed, controlled by an automatic relief valve. Removable countershaft box is equipped with taper roller bearings and sight feed lubricator. No outboard bearing required. The solid shaft is of large diameter; made of hammered alloy steel.

The large oil tank has ample cooling capacity. Provided with screen filter, also baffles for depositing fine grit. Removable cover and bottom plug allow easy drainage and cleaning.

Specifications

*No.		24	36	48
Width Feed Opening	in.	3	4½	7
Power Required	h.p.	25–30	50–75	75–125
Size Pulley	in.	24x10	28x12	36x14
Speed of Pulley	r.p.m.	725	650	550
Approx. Ship. Weight	lbs.	9100	21500	36000

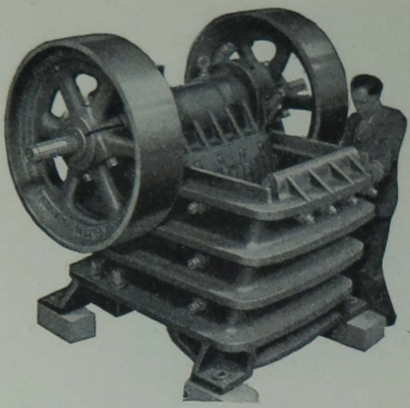
Capacities

Discharge In.	Capacity, Approx. Tons No. 24	No. 36	No. 48
⅜	15–25	......	......
½	20–30	35–60	......
¾	25–40	50–75	85–120
1	30–50	70–100	105–150
1¼	.....	90–115	135–190
1½	.....	110–130	170–210

*Corresponds to bottom diameter of head in inches.

†Special manganese concave bowl can be furnished for making finer respective products than shown in table.

Telsmith-Wheeling Jaw Crushers



This crusher is all steel, equipped throughout with cylindrical roller bearings. With the Telsmith roller bearings all internal frictional wear is taken on the bearing races. There is no wear upon the shaft. Upon replacement of the bearings, the user has practically a new crusher, except for parts in contact with the rock.

The main structure of the crusher is a box-like casting, made of annealed cast steel and reinforced by heavy horizontal ribs. The swinging jaw is made of annealed cast steel with deep substantial vertical ribs. Both stationary and swinging jaw plates or dies are of manganese steel, ground to assure an accurate fit. Corrugated dies are furnished except in special cases. The dies are reversible. Both jaw plates are clamped rigidly in place by wedge blocks.

The eccentric shaft both supports and actuates the swinging jaw. It is made of hammered alloy steel, large in diameter and accurately finished, ground and polished.

This type of crusher has a peculiar crushing action. The upper part of swinging jaw moves outward to crush coarse rock—then retreats. As the upper stroke terminates, the lower portion of the jaw moves forward to finish the crushing action—then recedes as a new cycle begins. This crushing stroke has proven very effective, particularly in producing the smaller sizes, ½, 1 and 1½-inch rock.

The length of lower crushing stroke can be altered by changing position of toggle. Lower toggle position shortens the stroke for finer crushing operations, while the upper position lengthens stroke to make larger rock and bigger capacity. Adjustment is wedge type on smaller sizes, shim type on larger sizes. Adjustment can be made while crusher is running.

Specifications

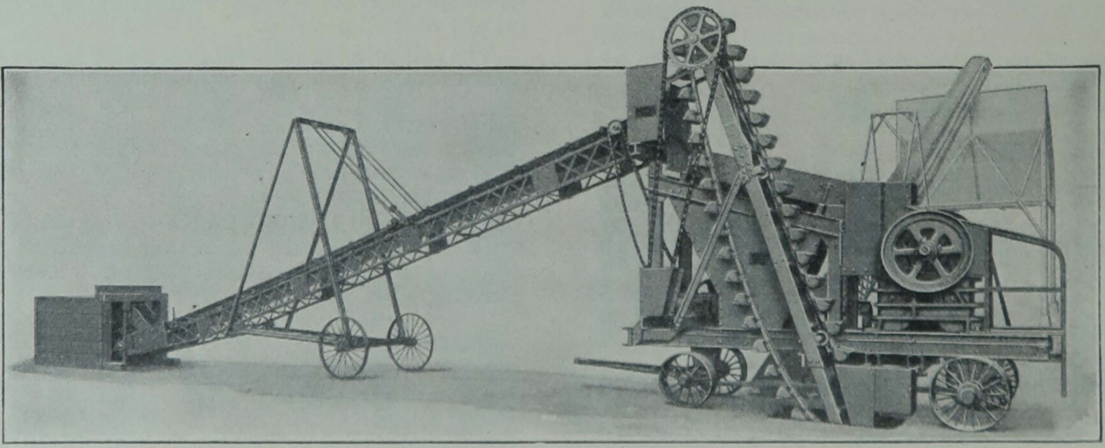
Size. Crusher (Feed Open.) In.	H.P. Req.	Drive Pulley—Inches Diam.	Face	Bore	R.P.M.	*Size Elevator Req. No.	*Diam. Screen Rec. In.	Crated for Export Approx. Wt. Lbs.	Contents Cu. Ft.
9x16	8–15	33	8½	3¹⁵⁄₁₆	420	2	24	5975	115
9x21	12–20	33	8½	3¹⁵⁄₁₆	420	3	32	6800	125
9x30	15–25	38	10½	4¾	350	4	32	11000	160
9x36	20–35	38	10½	4¾	350	5	40	12350	175
13x24	20–30	38	10½	4¾	350	5	40	10700	175
15x38	50–60	48	12½	6	275	5S	48	22000	370
18x30	50–60	48	12½	6	275	5S	48	22300	370

Capacities

Disch. Open. In.	Capacity, Tons per Hour—Size Crusher, Inches 9x16	9x21	9x30	9x36	13x24	15x38	18x30
½	3– 4	4– 5	.....	.....	.....	.....	.....
⅝	4– 5	5– 7	9–12	.....	.....	.....	.....
¾	5– 6	7– 9	12–15	15–18	.....	.....	.....
1	6– 8	9–11	15–18	18–24	.....	.....	.....
1¼	8–10	11–13	18–23	24–30	.....	.....	.....
1½	10–12	13–16	23–28	30–36	20–25	30–38	.....
2	.....	.....	.....	.....	22–27	33–40	.....
2½	.....	.....	.....	.....	25–30	38–45	30–40
3	.....	.....	.....	.....	28–35	42–52	35–45
3½	.....	.....	.....	.....	.....	.....	45–55

*For crusher output only.

Telsmith Portable Crushing, Loading and Screening Plants



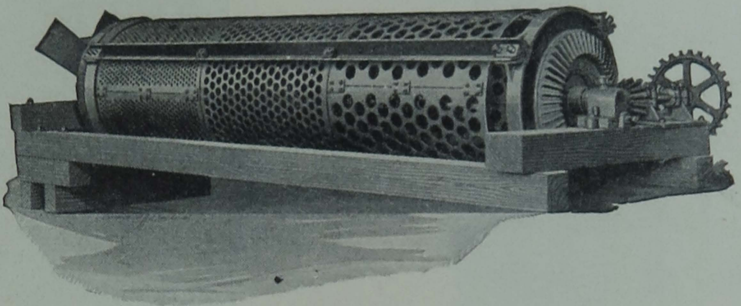
The Telsmith Portable Unit is widely used and favorably known in road construction circles. The outfits described present no strikingly new features; but follow closely the characteristics of earlier Telsmith rigs, which have proven so generally satisfactory.

The Telsmith Portable Unit is furnished both for coarse crushing and for fine reduction. Where specifications permit the use of coarse rock (1½–2½-inch sizes) the portable unit may be equipped with a primary breaker, sizes 6-B or 8-B. Such an outfit will deliver 1½ or 2-inch rock in enormous tonnages. Where finer sizing is required, the same outfit may be equipped with the No. 32-B reduction crusher, an ideal equipment for the production of ¾ or 1-inch aggregate in large capacity. Between these extremes, there is a wide range of service, which is spanned in liberal fashion by the Telsmith-Wheeling Jaw Crusher.

In the Telsmith Portable Unit, the crusher is in closed circuit with a bucket elevator and vibrating screen. No product can escape from the circuit to the finished product conveyor until it passes the screen. The standard unit is designed to deliver only one finished size, but this single product may be reclassified into several grades by installation of an additional screen over storage bin.

A large storage hopper is built into the standard portable unit and serves as a surge bin. In some cases, the finished product is loaded directly into trucks, by means of a short conveyor with clutch control. In other cases, the portable unit includes a steel bin and a longer product conveyor.

Telsmith Standard Dry Screens



This screen is a substantial and rugged equipment, built for big capacity and reliable service. The main barrel is open for its full length. The screen barrel is supported at the feed end by two large steel rollers. The head-ring is a heavy grey iron casting, to which is bolted a steel tracker-ring.

At the discharge end, the screen is supported by a large stub shaft, journalled in a long babbitted box.

The drive is by bevel gears, with an adjustable thrust bearing to preserve the proper mesh of the gear teeth. All standard screens include timber frame, driving pulley and countershaft.

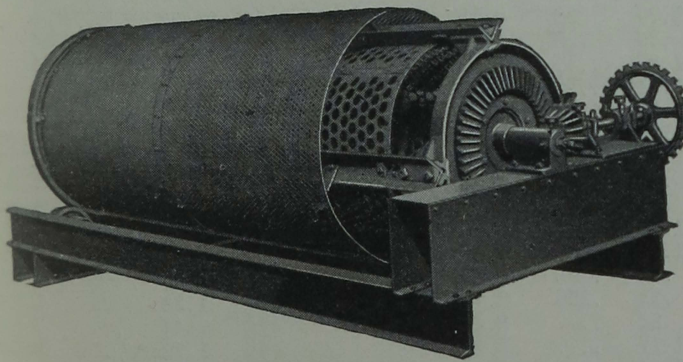
Customers are warned that bank gravel can seldom be economically screened through holes under ½ inch in size unless sprays are used to clear sand from perforations.

Specifications

Diameter Standard Screen........................in.	**24**	**32**	**40**	**48**	**60**
Basic Length for Computing Weight..............ft.	6	8	10	12	12
Weight Basic Length, About....................lbs.	1300	2500	4500	8300	13000
Maximum Length Recommended..................ft.	13	18	20	24	24
Additional Weight per Foot.....................lbs.	75	115	175	225	350
Weight of Sand or Dust Jacket per Ft., About....lbs.	45	55	70	80	100
I.D. of Dust Jacket..............................in.	34	45	55	65	78
Thickness Material in Main Cylinder.............in.	3/16	3/16	¼	¼	5/16
Speed of Cylinder...........................r.p.m.	19	16	14½	12¼	10
Size Driving Pulley..............................in.	24x6	30x6	36x8	42x10	48x12
Speed Driving Pulley........................r.p.m.	66	57	52	50	40
Horsepower Required..............................	3–4	5–7	7–10	10–14	15–20

Prices upon application.

Telsmith Hercules Washers



In this washer, the big rock is utilized to disintegrate extraneous matter in the gravel, particularly clay. The scrubber is divided into two compartments, the first imperforate and the other perforated. These compartments are separated by retainer rings which readily pass the smaller aggregate but retard the bigger boulders. In the first compartment, which is imperforate, the material is cascaded, soaked, the dirt being detached and softened. In the second compartment, the sand and dirty water are drained off, leaving the big rock unhampered in grinding up any residue of undissolved clay. Sprays are used to facilitate the ball-milling process.

Both sections of the scrubber may be equipped with scrubbing chains.

This washer is equipped throughout with anti-friction roller bearings. The supporting frame is made of I-beams.

Screen plates are replaceable without drilling. Special attention is given to the protection of gears and bearings.

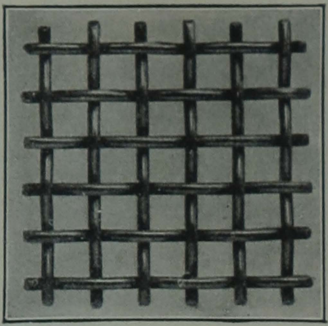
Specifications

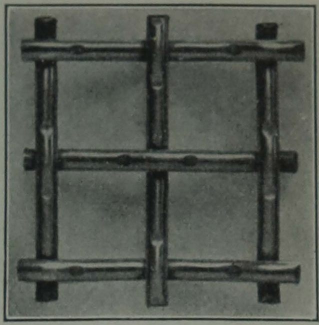
Diameter Washer..................................	**40**	**48**	**60**	**72**
Standard Length of Main Cylinder...............ft.	14	16½	19	22
Weight of Standard Length, About..............lbs.	8200	13400	20000	28000
Weight of Added Length per Ft., About.........lbs.	225	305	430	600
Standard Length of Scrubbing Section...........ft.	7	8½	10	12
Standard Length of First Jacket..................ft.	6	6	7	9
Standard Length of Second Jacket...............ft.	4	4	5	5
No. of Products, Including Sand and Over-Size, Std. Length.	4	4	4	4
Maximum Length of Washer Permissible..........ft.	18	20½	22	25
Thickness of Material in Main Cylinder...........in.	¼	5/16	⅜	½
Speed of Countershaft.......................r.p.m.	52	50	40	33
Size Driving Pulley..............................in.	36x8	42x10	48x12	60x12
Horsepower Required..............................	5–8	7–10	10–15	15–20
Water Required, Up to.......................g.p.m.	700	1200	2000	2800
*Capacity per Hour........................cu. yds.	50–60	90–100	150–160	210–230

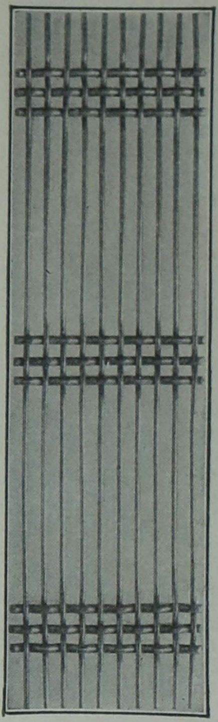
*Capacity ratings assume that aggregate contains about 50 per cent sand.

Prices upon application.

Robins Screen Surfaces


Fine Mesh


Coarse Mesh


Non-Blind

Gyrex Screens are equipped as standard with Robins Super-Gyraloy Screen Cloth for openings ⅛ inch or larger and with spring steel for smaller openings.

Robins screen cloth of various materials and constructions has been developed to meet the operating conditions encountered on vibrating screens.

Super-Gyraloy is made in ⅛-inch openings or larger. An abrasion-resisting steel of high tensile strength (225,000 lbs. per square inch); the hardest steel ever used for a screening surface (450 Brinell). It will outlast spring steel 3 to 1 in large openings and 5 to 1 in small openings, such as 3/16 inch.

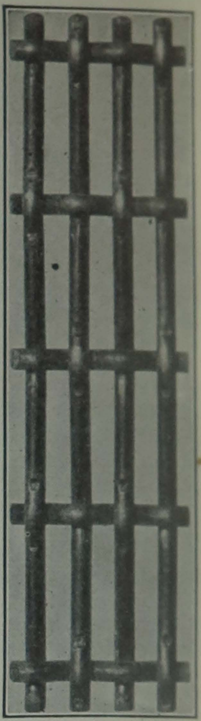
Gyraloy is made in ½-inch openings or larger. It is a superior type of spring steel at popular prices.

Abrusto is a special superior type of stainless steel. Resistant to abrasion, rustless, and has less tendency to blind than other materials. Recommended where acid conditions, atmospheric corrosion or extreme blinding are encountered.

Standard weaves of Robins Screen Cloths with square or rectangular openings are either double crimp, lock crimp or flat top construction.

Non-Blind is a special slotted-opening weave. Unbalanced construction makes it particularly effective in overcoming blinding. It also has a much higher "through" capacity than square openings. Non-Blind can safely be used with slabby or fingery material if a protective deck of slightly larger square-openings cloth is used above it. In cases of extreme blinding, Abrusto woven in Non-Blind construction will give better results than any other known medium.

Non-Spreader is an elongated-opening weave made in openings from 1/10 to ½ inch in width and of heavy section, high-tensile strength steel to prevent the spreading of the openings under the impact of wedge shaped pieces.


Non-Spreader

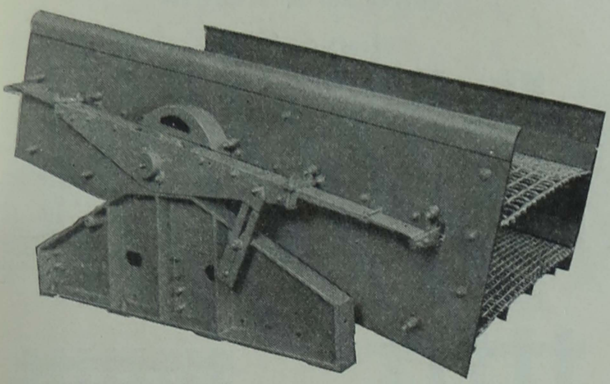
Standard Sizes, Weights, and Prices of Super-Gyraloy

Size Opening In.	Wire Gage	Per Sq. Ft.	Wire Diam. In.	Wt. Lbs. per Sq. Ft.
⅛	14	$1.76	.08	2.12
⅛x¼	14	1.60	.08	....
.142	14	1.63	.08	....
5/32	13	1.70	.092	....
3/16	13	1.42	.092	2.04
	12	1.44	.105	2.65
¼	13	1.20	.092	1.66
	12	1.21	.105	2.16
	11	1.22	.120	2.72
	10	1.22	.135	3.28
	8	1.30	.162	4.50
5/16	12	1.10	.105	1.82
	11	1.11	.120	2.19
	10	1.12	.135	2.76
	8	1.17	.162	3.87
⅜	12	.97	.105	1.33
	11	1.00	.120	2.01
	10	1.01	.135	2.36
	8	1.09	.162	3.40
	6	1.15	.192	3.73
7/16	12	.84	.105	1.37
	10	.88	.135	2.08
	8	.94	.162	3.00
	6	1.06	.192	4.23
½ or 9/16	12	.63	.105	1.22
	10	.66	.135	1.79
	8	.72	.162	2.68
	6	.88	.192	3.65
	4	1.10	.225	4.77
	¼″	1.40	....	5.90
⅝ or 11/16	10	.62	.135	1.59
	8	.64	.162	2.25
	6	.73	.192	3.18
	4	1.06	.225	4.12
	¼″	1.28	....	5.02
	5/16″	1.80	....	7.21
¾ or 13/16	8	.64	.162	1.92

Size Opening In.	Size Wire In.	Per Sq. Ft.	Wire Diam. In.	Wt. Lbs. per Sq. Ft.
¾ or 13/16	6 Ga.	$.70	.192	2.71
	4 Ga.	.88	.225	3.47
	¼	1.05	....	4.32
	5/16	1.61	....	7.02
	⅜	1.77	....	8.87
⅞ or 15/16	8 Ga.	.56	.162	1.69
	6 Ga.	.68	.192	2.39
	4 Ga.	.81	.225	3.12
	¼	.93	....	3.86
	5/16	1.40	....	5.76
	⅜	1.66	....	7.91
1 or 1⅛	6 Ga.	.61	.192	2.13
	4 Ga.	.73	.225	2.79
	¼	.86	....	3.41
	5/16	1.17	....	5.15
	⅜	1.44	....	7.11
	½	1.90	....	11.88
1¼ or 1⅜	4 Ga.	.66	.225	2.31
	¼	.83	....	2.83
	5/16	1.05	....	4.28
	⅜	1.33	....	5.96
	7/16	1.55	....	7.90
	½	1.80	....	9.98
1½ or 1⅝	4 Ga.	.61	.225	1.97
	¼	.76	....	2.42
	5/16	.93	....	3.67
	⅜	1.17	....	5.13
	7/16	1.40	....	6.79
	½	1.70	....	8.66
1¾ or 1⅞	¼	.57	....	2.11
	5/16	.86	....	3.21
	⅜	1.11	....	4.50
	7/16	1.32	....	6.01
	½	1.44	....	7.66
2 or 2⅛	¼	.64	....	1.86
	5/16	.83	....	2.83
	⅜	1.05	....	4.02

Size Opening In.	Size Wire In.	Per Sq. Ft.	Wire Diam. In.	Wt. Lbs. per Sq. Ft.
2 or 2⅛	7/16	$1.22	...	5.35
	½	1.40	....	6.86
2¼ or 2⅜	¼	.60	....	1.68
	5/16	.75	....	2.59
	⅜	.95	....	3.63
	7/16	1.16	....	4.76
	½	1.33	....	6.23
	9/16	1.60	....	7.68
	⅝	1.82	....	9.35
2½ or 2⅝	5/16	.68	....	2.33
	⅜	.90	....	3.30
	7/16	1.04	....	4.42
	½	1.22	....	5.68
	9/16	1.44	....	7.00
	⅝	1.70	....	8.56
2¾	5/16	.64	....	2.14
	⅜	.80	....	3.06
	7/16	.99	....	4.95
	½	1.13	....	5.19
	9/16	1.33	....	6.50
	⅝	1.60	....	7.89
3 or 3¼	⅜	.77	....	2.80
	7/16	.96	....	3.76
	½	1.02	....	4.85
	9/16	1.22	....	6.00
	⅝	1.50	....	7.32
3½ or 3¾	7/16	.85	....	3.27
	½	.95	....	4.24
	9/16	1.10	....	5.30
	⅝	1.25	....	6.40
4	½	.91	....	3.74
	9/16	1.01	....	4.70
	⅝	1.21	....	5.72
4½	½	.81	....	3.24
	9/16	.91	....	4.10
	⅝	1.10	....	5.00
5	⅝	.97	....	4.40

Robins Gyrex Screens



Gyrex cloth is spring-tensioned over arched frame preventing whip or crystallizing action. All bearings are super-sealed, all permanent connections electric welded, and all service connections jig-drilled for fitted bolts.

Application

Capacity.—The capacity of a given size of screen depends not only on the size of screen opening, but on the percentage of "throughs" in the feed, the size and quantity of large lumps and the character of the material.

Slope of Screening Surface.—The exact angle of highest efficiency for any screening operation must be found by experiment. The most important of determining factors is the tonnage of material (regardless of its weight per cubic foot) passing over the discharge end of the screen.

Stroke.—The stroke of a screen (diameter of circular orbit) varies with the size of mesh. The speed is suited to the stroke and may be modified by screening conditions.

Two strokes, ¼ and ½ inch are productive of the most efficient results over a wide range of screening. The ¼-inch stroke is essentially proper for fine screening and ½-inch stroke is best for coarse screening.

There may be an overlapping of stroke requirement on multiple deck screens. Experience then becomes the deciding factor in selecting the stroke for the best average result.

Gyrex screens are standardized on ¼ and ½-inch stroke. For unusual applications requiring a different stroke, a screen of the correct stroke can be provided.

Motor.—Motors required for Gyrex screens vary from 2 to 10 h.p. depending on screen size and other factors.

Chute.—The feed chute should deliver material evenly across the width of the screen and with as little drop and as little velocity as possible. The discharge chute should be wider than the screen and should come as close under the edge of the screening surface as is possible with a safe clearance. The slopes of chutes are governed by the nature of the material being handled.

Range of Models

These models are made with 1, 2 or 3 decks, and in some cases, four decks.

Gyrex screens are available with either cast base or structural steel base and there are optional standard strokes to suit varied screening conditions.

No.	Size of Each Deck Ft.	Screen Area per Deck Sq. Ft.	No.	Size of Each Deck Ft.	Screen Area per Deck Sq. Ft.
24- 54	2x 4½	9	**60–102**	5x8½	42½
24- 78	2x 6½	13	**60–120**	5x10	50
36- 54	3x 4½	13½	**60–144**	5x12	60
36- 78	3x 6½	19½	**60–168**	5x14	70
36–102	3x 8½	25½	**60–192**	5x16	80
36–120	3x10	30	**72–120**	6x10	60
48- 78	4x 6½	26	**72–144**	6x12	72
48–102	4x 8½	34	**72–168**	6x14	84
48–120	4x10	40	**72–192**	6x16	96
48–144	4x12	48	......	....	..

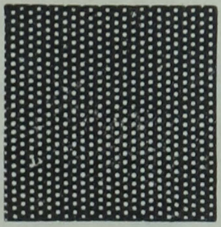
Robins Gyrex Screens can be obtained in a weight to meet any class of service and in a size to solve any problem because there are over 300 models and styles.

Recommendations will be made promptly on receipt of full information.

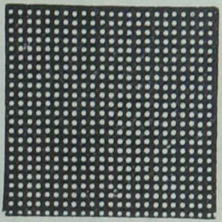
Prices on Application

Perforated Metals

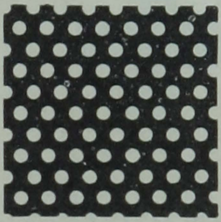
We can furnish all sizes and shapes of holes in steel, iron, copper, brass, zinc, bronze, lead, tin plate, aluminum, German silver, monel metal, celluloid, rubber, fibre, etc.



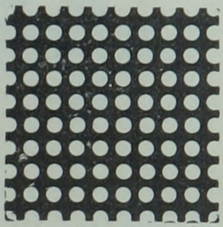
No. 00 (.020") Diagonal



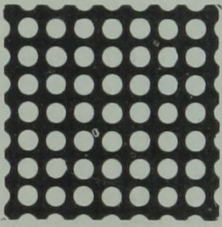
No. 0 (.024") Plain



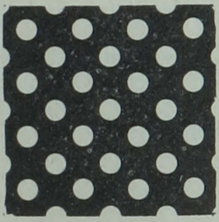
No. 5½ (.066") Diagonal



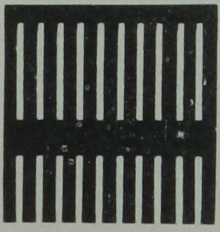
No. 6 (.079") Plain



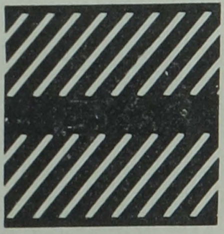
No. 7 (.103") Plain



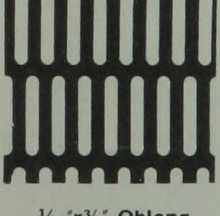
No. 7 (.103") Diagonal



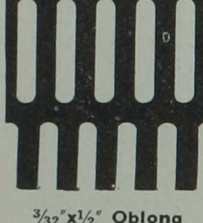
No. 5 (.032") Straight Slot



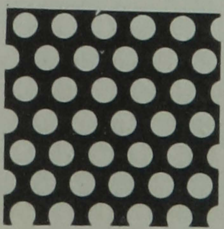
No. 5 (.032") Diagonal Slot



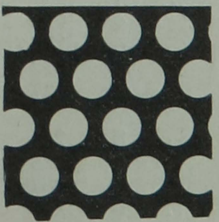
1/16"x3/8" Oblong



3/32"x1/2" Oblong



1/8" Round



3/16" Round

Prices upon application.

Coal and Gravel Screen Wire Cloth

For Grading Coal, Coke, Stone, Gravel or Sand

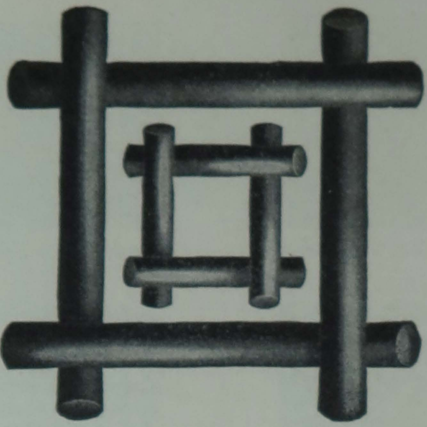


Illustration shows No. 8 wire, 3/4-inch space cleans coarse stove and small egg; No. 1/4-inch wire, 1 3/4-inch space takes stove out of egg coal.

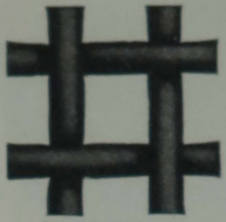
Space denotes actual opening between the wires.

The use of standard sizes as follows is recommended: 2 1/2-inch space, 1/4-inch wire; 2-inch space, 1/4-inch wire; 1 1/2-inch space, 1/4-inch wire; 1 1/4-inch space, No. 5 wire; 1-inch space, No. 5 wire; 3/4-inch space, No. 8 wire; 5/8-inch space, No. 9 wire; 1/2-inch space, No. 10 wire; 3/8-inch space No. 11 wire; 1/4-inch space, No. 13 wire.

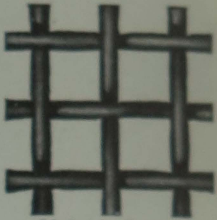
Space Between Wire In.	Approx. Frac. Size Rod of Wire In.	No. of Wire	Decimal Size of Wire	Price per Sq. Ft.
2 1/2	3/8	000	.375	$.75
	5/16	0	.312	.55
	*1/4	3	.244	.40
	...	4	.225	.38
2 1/4	5/16	0	.312	.58
	*1/4	3	.244	.44
	...	4	.225	.40
	...	5	.207	.38
2	5/16	0	.312	.67
	*1/4	3	.244	.55
	...	4	.225	.45
	...	5	.207	.40
	...	6	.192	.38
1 3/4	5/16	0	.312	.72
	*1/4	3	.244	.58
	...	4	.225	.40
	...	5	.207	.42
	...	6	.192	.38
1 1/2	5/16	0	.312	.80
	*1/4	3	.244	.61
	...	4	.225	.50
	...	5	.375	.45
	...	6	.312	.40
	...	7	.177	.35
1 1/4	1/4	3	.244	.65
	...	4	.225	.54
	*..	5	.207	.45
	...	6	.192	.42
	...	7	.177	.38
1	1/4	3	.244	.73
	...	4	.225	.58
	*	5	.207	.48
	...	6	.192	$.45
	...	7	.177	.40
	...	8	.162	.35
7/8	...	4	.225	.66
	...	5	.207	.55
	...	6	.192	.45
	*..	7	.177	.43
	...	8	.162	.40
3/4	...	5	.207	.64
	...	6	.192	.55
	...	7	.177	.47
	*..	8	.162	.40
	...	9	.148	.38
5/8	...	6	.192	.62
	...	7	.177	.55
	...	8	.162	.48
	*..	9	.148	.40
	...	10	.135	.33
1/2	...	7	.177	.62
	...	8	.162	.53
	...	9	.148	.46
	*..	10	.135	.40
	...	11	.120	.32
	...	12	.105	.28
3/8	...	9	.148	.55
	...	10	.135	.48
	*..	11	.120	.40
	...	12	.105	.32
1/4	...	11	.120	.48
	...	12	.105	.44
	*..	13	.092	.40
3/16	...	13	.092	.48

Double Crimped Heavy Wire Screen Cloth

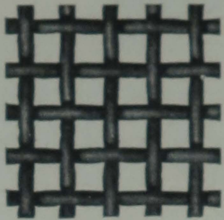
Iron or Steel



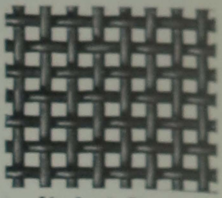
5/16-Inch Space



1/4-Inch Space



1/8-Inch Space



1/16-Inch Space

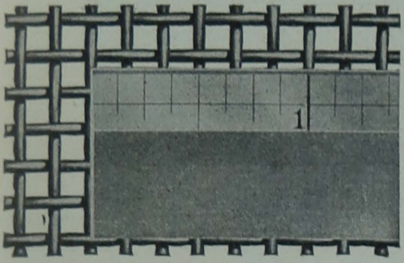
Double crimped heavy wire screen cloth is used in grading coal, crushed rock, stone, sand and gravel into various marketable sizes.

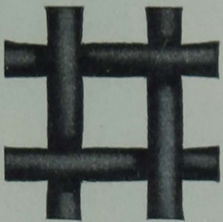
The actual opening between wires is technically known as space, thus 1/4-inch space, .135 wire implies that the wires are 1/4 inch apart in the clear and that the diameter of the wire is .135 inch.

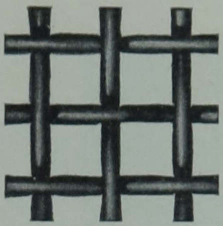
In ordering specify the length and width of each piece, the size of the opening in the clear, the decimal size of the wire and the kind of material from which the cloth is to be made. Full rolls contain 100 lineal feet or more.

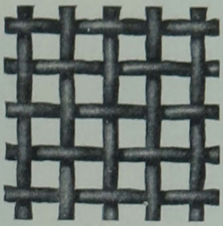
Clear Opening or Space Inches	Diam. of Rod or Wire Inches	Price per Square Foot	Clear Opening or Space Inches	Diam. of Rod or Wire Inches	Price per Square Foot	Clear Opening or Space Inches	Diam. of Rod or Wire Inches	Price per Square Foot
1	3/4	$3.75	5/8	9/16	$3.00	7/16	.120	$.38
1	11/16	3.00	5/8	1/2	2.50	7/16	.105	.32
1	5/8	2.35	5/8	7/16	2.00			
1	9/16	1.85	5/8	3/8	1.65	3/8	.307	2.15
1	1/2	1.55	5/8	5/16	1.50	3/8	.283	1.75
1	7/16	1.40	5/8	1/4	1.10	3/8	.263	1.60
1	3/8	1.25	5/8	.225	.90	3/8	.244	1.50
1	5/16	1.00	5/8	.207	.75	3/8	.225	1.10
1	1/4	.75	5/8	.192	.60	3/8	.207	.90
1	.225	.60	5/8	.177	.55	3/8	.192	.80
1	.207	.55	5/8	.162	.50	3/8	.177	.75
1	.192	.50	5/8	.148	.40	3/8	.162	.60
1	.177	.42	5/8	.135	35	3/8	.148	.55
1	.162	.38				3/8	.135	.45
						3/8	.120	.40
7/8	5/8	2.75				3/8	.105	.35
7/8	9/16	2.20	1/2	7/16	2.50			
7/8	1/2	1.75	1/2	3/8	2.00	5/16	.225	1.50
7/8	7/16	1.50	1/2	5/16	1.60	5/16	.207	1.10
7/8	3/8	1.35	1/2	1/4	1.20	5/16	.192	.90
7/3	5/16	1.20	1/2	225	.95	5/16	.177	.80
7/8	1/4	.80	1/2	207	.80	5/16	.162	.65
7/8	.225	.70	1/2	.192	.68	5/16	.148	.60
7/8	.207	.60	1/2	.177	.60	5/16	.135	.50
7/8	.192	.52	1/2	.162	.55	5/16	.120	.45
7/8	.177	.45	1/2	.148	.45	5/16	.105	.38
7/8	.162	.40	1/2	.135	.40			
			1/2	.120	.35			
3/4	5/8	3.25	1/2	.105	.30	1/4	.225	1.85
3/4	9/16	2.60				1/4	.207	1.65
3/4	1/2	2.00	7/16	5/16	1.75	1/4	.192	1.10
3/4	7/16	1.65	7/16	9/32	1.65	1/4	.177	.90
3/4	3/8	1.50	7/16	17/64	1.50	1/4	.162	.75
3/4	5/16	1.40	7/16	1/4	1.30	1/4	.148	.65
3/4	1/4	.90	7/16	.225	1.00	1/4	.135	.55
3/4	.225	.75	7/16	.207	.85	1/4	.120	.50
3/4	.207	.65	7/16	.192	.75	1/4	.105	.45
3/4	.192	.55	7/16	.177	.65	1/4	.092	.38
3/4	.177	.50	7/16	.162	.58	..	....	....
3/4	.162	.45	7/16	.148	.50	..	....	....
3/4	.148	.38	7/16	.135	.42	..	....	....

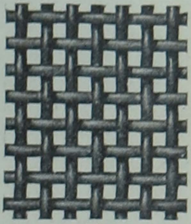
Double Crimp Steel Wire Cloth and Screens


6 Mesh


2 Mesh


3 Mesh


5 Mesh


8 Mesh

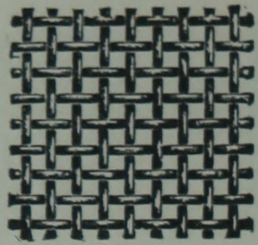
Mesh in wire cloth is the number of openings per lineal inch. To count the number of openings in an inch measure from the center of a wire to a point 1 inch distance, thus 6 mesh as shown above should count 6 openings from the center of a wire to the center of a wire 1 inch from that point.

Mesh Center to Center Wires Inch	Diameter Wire Decimal Inch	Size Opening Decimal Inch	Price per Square Foot	Number Meshes per Lineal Inch	Diameter Wire Decimal Inch	Size Opening Decimal Inch	Price per Square Foot	Number Meshes per Lineal Inch	Diameter Wire Decimal Inch	Size Opening Decimal Inch	Price per Square Foot
1	.177	.823	**$.50**	**4**	.035	.215	**$.13**	**20**	.017	.0330	**$.35**
1	.162	.838	**.40**	**4**	.032	.218	**.12**	**20**	.018	.0320	**.40**
1	.148	.852	**.35**	**5**	.105	.095	**.85**	**22**	.017	.0285	**.40**
1	.135	.865	**.30**	**5**	.092	.108	**.65**	**22**	.016	.0295	**.35**
1	.120	.880	**.25**	**5**	.080	.120	**.55**	**22**	.015	.0305	**.30**
1	.105	.895	**.22**	**5**	.072	.128	**.50**	**22**	.014	.0315	**.26**
1	.092	.908	**.18**	**5**	.063	.137	**.40**	**22**	.0135	.0320	**.24**
¾	.207	.543	**.75**	**5**	.054	.146	**.30**	**24**	.023	.0187	**1.00**
¾	.192	.558	**.60**	**6**	.092	.075	**.80**	**24**	.020	.0217	**.90**
¾	.177	.573	**.55**	**6**	.080	.087	**.60**	**24**	.018	.0237	**.65**
¾	.162	.588	**.50**	**6**	.072	.095	**.55**	**24**	.017	.0247	**.50**
¾	.148	.602	**.40**	**6**	.063	.104	**.50**	**24**	.016	.0257	**.40**
¾	.135	.615	**.35**	**6**	.054	.113	**.40**	**26**	.011	.0275	**.24**
¾	.120	.630	**.30**	**6**	.047	.120	**.30**	**26**	.010	.0285	**.23**
⅝	.162	.463	**.55**	**6**	.041	.126	**.25**	**26**	.0095	.0290	**.22**
⅝	.148	.477	**.45**	**6**	.035	.132	**.22**	**26**	.009	.0295	**.21**
⅝	.135	.490	**.40**	**8**	.063	.062	**.60**	**28**	.017	.0187	**.90**
⅝	.120	.505	**.35**	**8**	.054	.071	**.55**	**28**	.011	.0247	**.28**
⅝	.105	.520	**.30**	**8**	.047	.078	**.50**	**28**	.010	.0257	**.26**
⅝	.092	.533	**.23**	**8**	.041	.084	**.40**	**28**	.0095	.0262	**.24**
2	.177	.323	**.75**	**10**	.054	.046	**.75**	**28**	.009	.0267	**.23**
2	.162	.338	**.60**	**10**	.047	.053	**.60**	**30**	.017	.0163	**1.00**
2	.148	.352	**.55**	**10**	.041	.059	**.55**	**30**	.016	.0173	**.90**
2	.135	.365	**.45**	**10**	.035	.065	**.50**	**30**	.015	.0183	**.60**
2	.120	.380	**.40**	**10**	.032	.068	**.40**	**30**	.014	.0193	**.45**
2	.105	.395	**.35**	**10**	.028	.072	**.30**	**35**	.015	.0136	**1.00**
2	.092	.408	**.25**	**10**	.016	.084	**.11**	**35**	.014	.0146	**.90**
2	.080	.420	**.20**	**10**	.015	.085	**.10**	**35**	.0135	.0151	**.55**
2	.072	.428	**.18**	**12**	.047	.036	**.75**	**35**	.013	.0156	**.45**
2½	.148	.252	**.60**	**12**	.041	.042	**.60**	**35**	.011	.0176	**.40**
2½	.135	.265	**.55**	**12**	.035	.048	**.55**	**40**	.0135	.0115	**1.00**
2½	.120	.280	**.45**	**14**	.041	.030	**.75**	**40**	.013	.0120	**.90**
3	.148	.185	**.75**	**14**	.035	.036	**.60**	**40**	.011	.0140	**.55**
3	.135	.198	**.60**	**14**	.032	.039	**.55**	**50**	.010	.0100	**1.25**
3	.120	.213	**.55**	**14**	.028	.043	**.50**	**50**	.0095	.0105	**1.00**
3	.105	.228	**.45**	**14**	.025	.046	**.40**	**50**	.009	.0110	**.80**
3	.092	.241	**.38**	**16**	.041	.0215	**1.20**	**50**	.0085	.0115	**.55**
3	.080	.253	**.35**	**16**	.035	.0275	**1.00**	**50**	.008	.0120	**.50**
3	.072	.261	**.25**	**16**	.032	.0305	**.80**	**60**	.008	.0087	**1.20**
3	.063	.270	**.20**	**16**	.028	.0345	**.60**	**60**	.0075	.0092	**1.00**
4	.135	.115	**1.00**	**16**	.025	.0375	**.50**	**60**	.007	.0097	**.85**
4	.120	.130	**.75**	**18**	.028	.0276	**.80**	**60**	.00675	.0099	**.75**
4	.105	.145	**.60**	**18**	.025	.0306	**.60**	**70**	.007	.0073	**1.20**
4	.092	.158	**.52**	**18**	.023	.0326	**.50**	**70**	.00675	.0075	**1.10**
4	.080	.170	**.42**	**18**	.020	.0356	**.40**	**70**	.0065	.0078	**.90**
4	.072	.178	**.35**	**18**	.018	.0376	**.32**	**70**	.06625	.0080	**.85**
4	.063	.187	**.27**	**20**	.028	.0220	**1.00**	**80**	.0055	.0070	**1.40**
4	.054	.196	**.22**	**20**	.025	.0250	**.90**	**80**	.00525	.0073	**1.30**
4	.047	.203	**.19**	**20**	.023	.0270	**.65**	**80**	.005	.0075	**1.20**
4	.041	.209	**.14**	**20**	.020	.0300	**.50**	**90**	.005	.0061	**1.50**
...	....	....	...	..	....	.....	....	**100**	.0040	.0060	**1.75**

When ordering, always specify the number of rolls or pieces, length and width of each roll or piece, size of opening or mesh, decimal size of wire and the material from which the cloth is to be made.

Brass and Copper Wire Cloth

Standard Market Grade



No length less than 100 feet shall be considered a roll. The mesh in wire cloth denotes the number of openings per lineal inch.

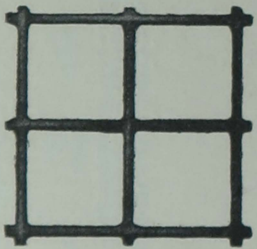
Mesh	No. of Wire	Decimal Size Wire	Decimal Size Opening	Price per Sq. Foot	Mesh	No. of Wire	Decimal Size Wire	Decimal Size Opening	Price per Sq. Foot
2	16	.065	.437	**$.65**	**20**	28	.0165	.033	**$.60**
3	17	.058	.275	**.70**	**22**	29	.0155	.0300	**.60**
4	18	.049	.201	**.70**	**24**	30	.01375	.0280	**.65**
5	19	.040	.160	**.70**	**30**	31	.01225	.0211	**.70**
6	20	.035	.132	**.70**	**40**	33	.01025	.0148	**.70**
8	22	.0295	.095	**.65**	**50**	35	.009	.0110	**.85**
10	23	.027	.073	**.65**	**60**	36	.0075	.0092	**.85**
12	24	.025	.058	**.65**	**70**	37	.0065	.0078	**1.00**
14	25	.023	.048	**.65**	**80**	38	.00575	.0068	**1.25**
16	26	.0205	.042	**.65**	**90**	39	.0050	.0061	**1.50**
18	27	.01875	.037	**.60**	**100**	40	.0045	.0055	**1.75**

Brass Wire Strainer Cloth

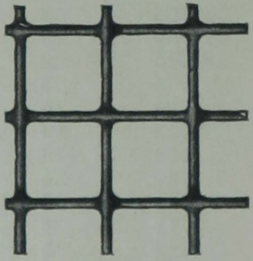
Mesh	Price, per Sq. Foot	Mesh	Price, per Sq. Foot
40	**$.42**	**60**	**$.60**
50	**.58**	**70**	**.70**

Galvanized Steel Wire Cloth

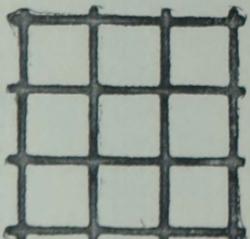
Standard Hardware Grades



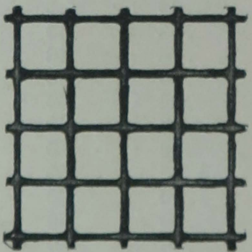
2x2 Mesh



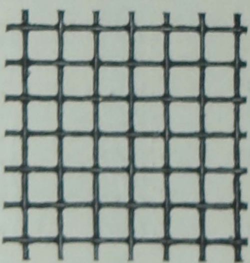
2½x2½ Mesh



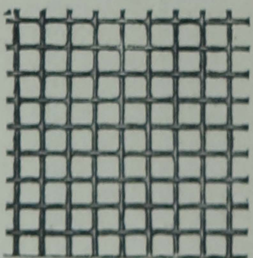
3x3 Mesh



4x4 Mesh



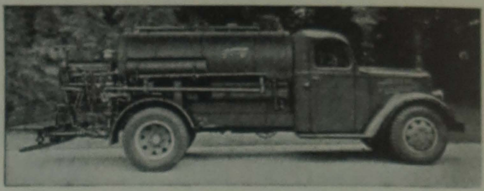
6x6 Mesh



8x8 Mesh

Widths, 24 to 48 inches.
Full rolls contain 100 lineal feet each.

Kinney Bituminous Distributors



This distributor applies all types of asphalts, cutbacks, emulsions, road oils and tars evenly and at the quantity specified. The Kinney Pump is accurate as a meter, measuring exactly the quantity per square yard called for by the contract. Large pump capacity makes it unnecessary to gear down the truck to meet application requirements.

Will apply 2.5 gallons per square yard to a 20-foot wide road at one application at a speed of .8 miles per hour or any quantity from .1 to 3. gallons per square yard at proportionate road speeds.

Standard parts such as valves, pipe fittings, bearings, etc., are used wherever possible so that replacements, if necessary, can be made quickly from local stocks.

Special parts are carried in stock and are interchangeable.

The engine is a product of a most reputable builder and was selected because of the widely located service stations maintained by the maker.

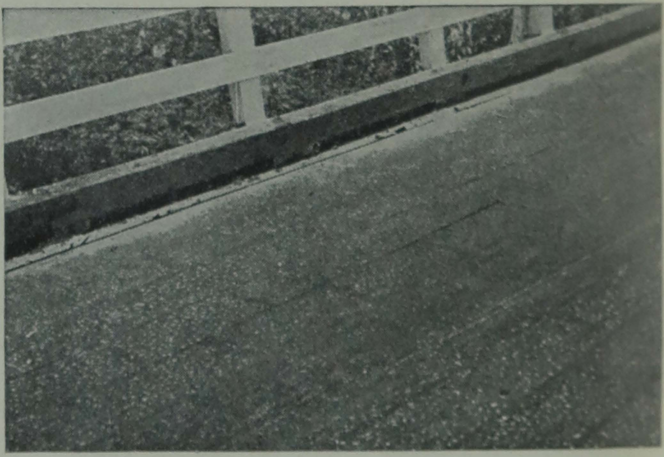
Insurance rates on Kinneys are low. Fuel tanks and auxiliary gasoline tanks are located well away from the burner. No open flame is required to heat the pump as it is jacketed and connected to the truck engine exhaust. Piping is not boxed in so there is no place for explosive gases from cutbacks and gassy materials to accumulate.

Quantities as small as one-fifth of a load can be safely heated in a Kinney as the top bank of tubes can be cut out of service in a few seconds.

The entire equipment is designed for proper load distribution on the truck chassis, preventing undue tire wear.

Prices and specifications on request.

Carey Elastite Mineral Surfaced Asphalt Plank



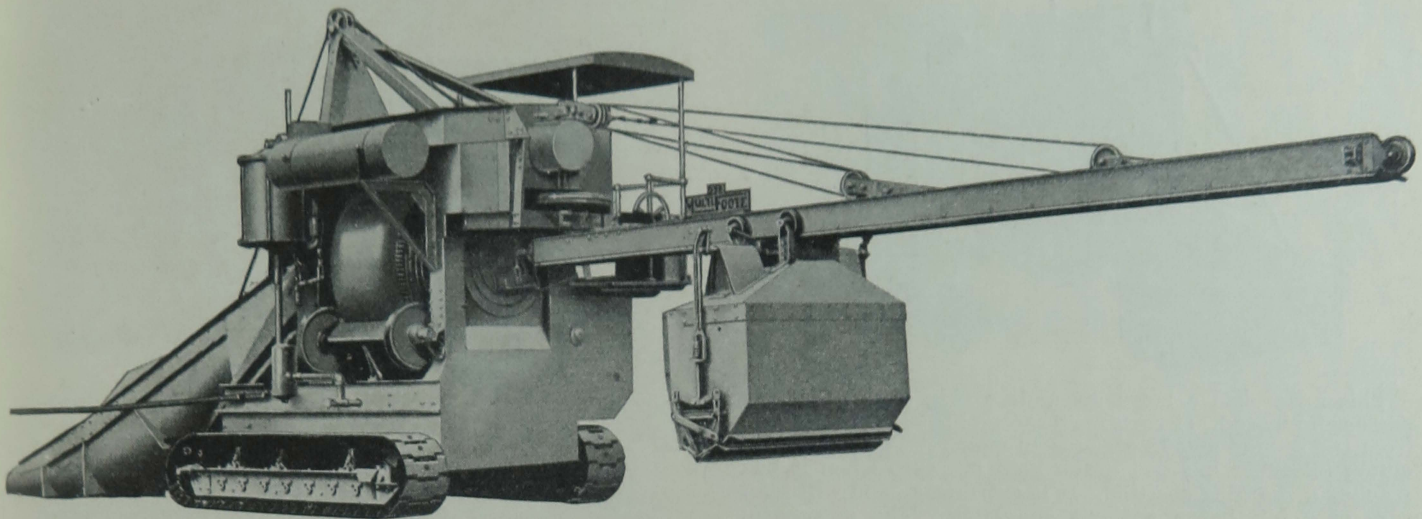
To lay this plank, approximately 15 pounds of 30D barbed galvanized nails and 45 pounds of No. 100 asphalt are required per 100 square feet of plank; add 15 per cent of asphalt for laying in winter.

Thick	in.	1	1¼	1½	2
Width	in.	12	12	12	12
Length	ft.	2	2	2	2
Wt. per 100 Sq. Ft.	lbs.	850	1050	1250	1650

BRIDGE HARDWARE AND MATERIAL

We stock and furnish, for both timber and concrete bridges, such specialties as: Expansion joint material (rubber or asphalt), galvanized bolts, lags, drift pins, pile shoes and protectors, washers, copper seal strip; asphalt planking; etc.

MultiFoote Concrete Pavers



MultiFoote Concrete Pavers have a combination of advantages unequalled by other paving equipment.

The Streamlined Skip.—Wide, with plenty of room for the truck and heavily cross reinforced with structural steel to withstand uneven loading and dropping to the grade.

The 40-Second Double Cone Drum.—Actual tests have demonstrated the ability of the MultiFoote Double Cone Drum to deliver in 45 seconds, concrete equal to 60 seconds mixing in a cylindrical drum.

The No-Pressure Water Tank.—Consists of two units, a measuring tank and a supply tank. The measuring tank is cut off entirely from line pressure during operation by valves, one between the drum and measuring tank and one between the measuring tank and supply tank. Thus there is no possibility of line pressure affecting the tank's accuracy.

Control.—Through automatic operation which brings the ultimate in synchronization—a perfection of overlapping operations that can only be accomplished by mechanical means. The simple engagement of a hand lever or foot pedal begins the entire automatic cycle of operation and clips off seconds from the mixing cycle.

Simplicity.—A MultiFoote maxim that assures ease of maintenance and repair. Note the power take-off—fully enclosed, dirt-tight, running in oil. There is only one shaft with necessary clutches for driving drums, skip hoist and boom and bucket. All high speed gears are mounted on anti-friction bearings. Drum rollers roll on anti-friction bearings. The bucket travels on anti-friction bearings; every possible step has been taken to assure easy upkeep and save power.

Power.—Either a Hercules or Waukesha heavy duty engine is furnished as standard equipment.

Cooling is through an oversize radiator in keeping with the best automotive practices, eliminating the heavy water cooling tank. If desired, a Diesel engine can be furnished.

Capacity, 27 cubic feet plus 100% on 6%—grades in accordance with A.G.C. standards. Total guaranteed capacity, 29.7 cubic feet.

Complete specifications upon request.

Adnun Black Top Pavers

The Adnun Black Top Paver is a self-contained unit operating under its own power and steered by its operator along the line of curb or other guide line. Simple in design and construction. Trouble-free, dependable unit that will fit every black top problem. Lays any mix, hot or cold, any width, any thickness, requires no forms.

Power is applied to both front wheels and rear rollers. This assures ease of handling and accuracy of control. The machine is steered with a worm gear from the front which assures the maintenance of perfect alignment. For the purpose of short turning, either rear roller can be disengaged. Three speeds forward and reverse are provided. The working speeds are 10 and 25 feet a minute. The traveling speed is 150 feet a minute.

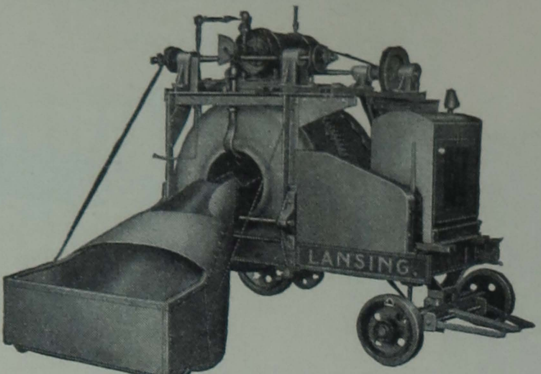
The outstanding feature of the Adnun Black Top Paver is accuracy. The Adnun will handle extremely rough subgrades with the minimum of surface deflection, lay a joint that cannot be detected between parallel courses, abut a curb with little or no hand raking, and crown or bank a road to any specifications now in use.

This accuracy is in large part the result of the cutter bar which consists of a moving blade. Moving back and forth it provides a positive strike-off that assures a course of just the desired contour and thickness.

Two operating speeds make it possible to meet all conditions of mix efficiently.

Detailed specifications upon request.

Lansing Concrete Mixers



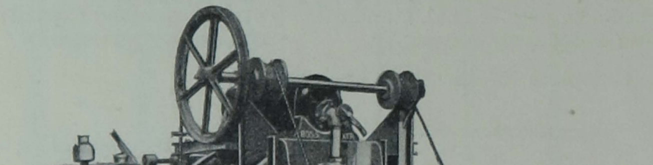
This mixer has a large streamline skip with all sharp angles eliminated. It requires 8 seconds to elevate the skip from the ground and 15 seconds to empty. The automatic clutch knockout bar and brake hold the skip when it has reached a charging position. It is extra large and will take care of a full batch without shoveling. The automatic measuring water tank insures the same amount of water in every batch and makes each batch uniform. The outlet and inlet of the tank is fitted with quick acting brass gate valves which assure quick and positive control of the water.

		No. 7S	No. 10S
Capacity, Mixed	cubic feet	7	10
Capacity, Unmixed	cubic feet	11	15
Size of Frame	inches	96x41	104x44
Diameter Front Wheels	inches	18	18
Diameter Rear Wheels	inches	24	24
Diameter Mixer Drum	inches	48x32	56½x35
Drum Openings	inches	20	21
Diameter Water Tank	inches	16x22	14x28
H.P.		8	12
Standard Speed	r.p.m.	1800	1800

Prices and further information upon application.

No. 10S Boss Cement Mixers

1-2 Bagger Type—Power Loading Type



No. 10S-1

For general concrete contracting work. Skip raises in 7 seconds, batch discharged from drum in approx. 10 seconds.

Overall length, 99 in. Overall width, hopper up, 98 in.; hopper down, 126 in. Overall height, hopper up, 115 in.; hopper down, 96 in. Discharge clearance, distance between end of discharge spoon and ground, 27 in.

No. 10S-1 Non-Tilter

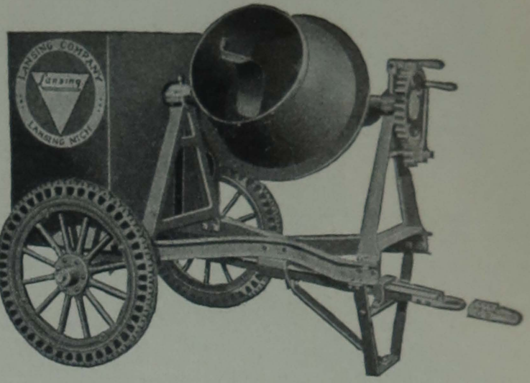
Four steel wheels; 4 cylinder 10 h.p. radiator cooled Le Roi engine; magneto; steel engine housing; automatic stop power loader with sub-hopper; measuring pressure water tank; stub hitch. Approx. shipping weight, 4730 pounds.

No. 10S-2 Non-Tilter

Same as No. 10S-1 except four solid rubber-tired roller bearing wheels. Approx. shipping weight, 4864 pounds.

Prices upon application.

No. 3-B Lansing Trailer Concrete Mixers



An ideal mixer for the contractor doing small or medium sized jobs and whose work requires frequent moving of the mixer. This machine is easily charged and discharged. It operates well on all kinds of concrete work. Will mix wet concrete for pouring walls, sidewalks, etc., dry concrete for concrete blocks or mortar for laying bricks.

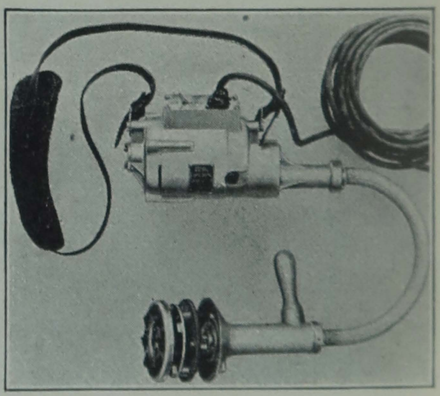
Has an extra large drum mounted on ball bearings. Furnished with a Lansing engine, 1½ h. p. with Wico magneto.

Capacity, Dry	cu. ft.	4
Capacity, Wet	cu. ft.	3
Diameter of Drum	inches	24½
Depth of Drum	inches	25
Diameter of Opening	inches	18
Cushion Tire	inches	30x3½
Frame	inches	3 Channel
Weight	pounds	1080

Prices and special catalogue upon application.

Berg Electric Concrete Surfacer and Finisher

New Improved Model A



For removing fins, board or form marks and all surface irregularities from concrete construction.

In addition, the Berg is ideal for producing special finishes. It cuts brick walls preparatory to stucco application and grinds paint from bricks. The Carbo Disc, interchangeable with the cutter head, is used for smoothing and grouting surfaces.

The Berg produces more finished work in less time and with less labor and expense than other methods. One man with a Berg can do the work of four rubbing by hand.

The machine is of simple construction and any workman can quickly become expert in its operation. All parts are made of finest materials and are carefully assembled.

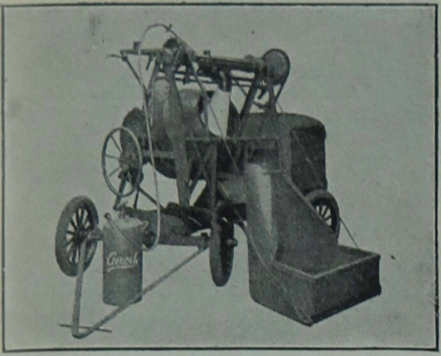
The driving motor is a ⅓ h.p. General Electric universal type. It can be supplied for use on either 110–125 or 220–250 volts, either voltage can be operated on both a.c. and d.c. current. Speed, approximately 2800 r.p.m.

Total weight, 20 pounds. Shipping weight, 45 pounds.

A complete set of accessories is included with each machine.

Complete .... each $152.50

Aeroil Concrete Heaters



Concrete heated by the Aeroil method hardens and sets before it has a chance to freeze. The concrete remains warm 48-56 hours after pouring.

The Aeroil Concrete Heater heats the whole mix right in the drum. It can be easily attached to almost any type or size mixer.

Consists of oil pressure tank, oil hose, kerosene burner, flame distributor with clamps for fastening to mixer and windshield.

No. 21 Concrete Heaters

For tilting mixers of 3 or 5 cubic feet capacity. Consists of a 10-gallon galvanized, welded steel oil pressure tank, 12 feet of oil hose, No. 21 burner with bracket. Approximate oil consumption 1½ gallons per hour.

Shipping weight 100 pounds.

No. **21**....................................each **$70.00**

No. 22 Concrete Heaters

For tilting mixers of 7, 10 or 14 cubic feet capacity. Consists of a 15-gallon galvanized, welded steel oil pressure tank, 12-foot oil hose, No. 22 burner with bracket. Approximate oil consumption 2 gallons per hour.

Shipping weight 120 pounds.

No. **22**....................................each **$80.00**

No. 23 Concrete Heaters

For tilting mixers of 21 or 28 cubic feet capacity. Consists of a 20-gallon galvanized, welded steel oil pressure tank, 15-foot oil hose, No. 23 burner with bracket. Approximate oil consumption 3 gallons per hour.

Shipping weight 160 pounds.

No. **23**....................................each **$95.00**

No. 24 Concrete Heaters

For concrete mixers of 3 or 5 cubic feet capacity. Approximate oil consumption 1½ gallons per hour.

Shipping weight 120 pounds.

No. **24**, with 15-Gal. Tank and 12-Ft. Hose.....each	**$80.00**
No. **24**, without Tank and Hose.................each	**42.50**

No. 25 Concrete Heaters

For concrete mixers of 7, 10 or 14 cubic feet capacity. Approximate oil consumption 2 gallons per hour.

Shipping weight 150 pounds.

No. **25**, with 20-Gal. Tank and 12-Ft. Hose.....each	**$90.00**
No. **25**, without Tank and Hose.................each	**47.50**

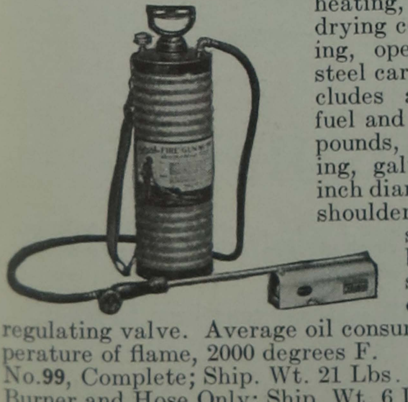
No. 26 Concrete Heaters

For concrete mixers of 21 or 28 cubic feet capacity. Approximate oil consumption 3 gallons per hour.

Shipping weight 150 pounds.

No. **26**, with 20-Gal. Tank and 15-Ft. Hose....each	**$100.00**
No. **26**, without Tank and Hose................each	**56.00**

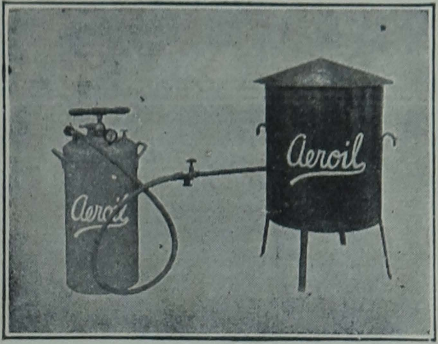
No. 99 Aeroil Fire Guns



A kerosene torch for thawing, heating, melting ice and snow, drying concrete for waterproofing, opening doors on frozen steel cars and hoppers, etc. Includes a 4-gallon corrugated fuel and air tank, tested at 100 pounds, made of copper bearing, galvanized steel, with 2-inch diameter air pump, snap-on shoulder strap, 7 feet of oil-resisting rubber hose with brass hose nipples, and seamless steel coil Aeroil Burner with bronze regulating valve. Average oil consumption, 1½ g.p.h. Temperature of flame, 2000 degrees F.

No.**99**, Complete; Ship. Wt. 21 Lbs..............each	**$20.00**
Burner and Hose Only; Ship. Wt. 6 Lbs........each	**12.50**

Aeroil Smokeless Salamanders



This salamander is built along the lines of the old coke burning salamander, except that the grates have been removed and replaced by the Aeroil Smokeless Kerosene Burner, producing a red hot fire within 5 minutes after lighting the burner.

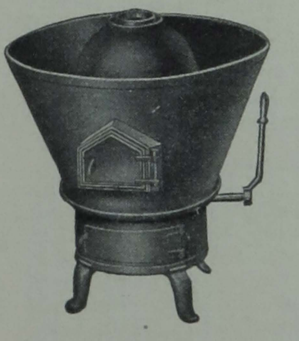
The heating chamber is 20 inches in diameter and 24 inches high. Overall height with legs and cover, 40 inches.

Tanks are of heavy welded steel, galvanized inside and out, equipped with built-in hand air pump, pressure gauge. 6 feet of special oil hose and a combination needle valve-oil strainer is supplied. Average oil consumption per hour, 1 gallon.

Shipping weight complete, with 10-gallon tank, 140 pounds; with 15-gallon tank, 160 pounds; with 20-gallon tank, 180 pounds.

No. **1**, Complete with 5-Gallon Oil Tank.......each	**$65.00**
No. **2**, Complete with 10-Gallon Oil Tank......each	**70.00**
No. **3**, Complete with 15-Gallon Oil Tank......each	**75.00**
No. **4**, Complete with 20-Gallon Oil Tank......each	**80.00**
Salamander with Burner, Valve and Hose, without Tank.......................................each	**40.00**
Special Burner Outfit Only, with 10-Gallon Tank for Coke-Burning Type Salamander...............each	**50.00**
Special Salamander Burner Only, with Extension Pipe and Combination Valve Strainer, without Hose and Tank.................................each	**22.50**
2 Salamanders with One 20-Gallon, Double Valve, Tank and 2 Lengths of Hose, Complete......each	**115.00**

Sutton Sand Driers



A heavy, massively built cast iron stove, surrounded by a sheet steel skirting. Wet sand is shoveled into the skirting, and as it dries, will automatically run out through the holes in the perforated ring at the bottom of skirting.

Burns any hard fuel.

Can be equipped with upright cast iron gratings which surround the main body and increase drying capacity.

	Each			Weight, Pounds	
No	Without External Grating	With External Grating	Capacity in 10 Hours Tons	Without External Grating	With External Grating
1	......	......	10	866	1039
2	......	......	5	479	593
3	......	......	3½	401	513

No. 42 Littleford Salamanders

Wood, Coal or Coke Burning

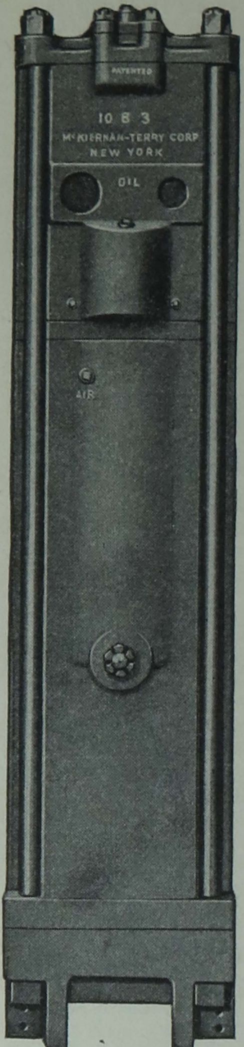
Shell is formed of one piece of 18-gage steel bolted at side. Can be nested for storage by removing bolts.

Inside the shell is a removable non-warping grate bar, and below that a removable ash pan.

Can be provided, at an additional charge, with a cover and 6-inch collar for vent pipe, or deflector hood.

No.............	1	2	3
No. 42.......ea.	**$4.00**	**$4.75**	**$5.50**
Hinged Cover ....ea.	**1.50**	**1.85**	**2.10**
Deflector Hoods ....ea.	**2.25**	**2.50**	**3.00**
Extra Grates.ea.	**1.10**	**1.40**	**1.60**
Diam........in.	15	18	20
Ht. Shell.....in.	26	30	30
Wt...........lbs.	30	46	50

McKiernan-Terry Pile Hammers



This machine is adapted to all kinds of work, from the lightest wooden sheeting to the heaviest concrete monoliths, including the largest timber piles, pipe piles, and steel sheet sections.

Hammer is double-acting, that is, the motive power (steam or compressed air) not only lifts the driving ram but also accelerates the down-strokes with such force that every blow has several times the driving power that gravity alone would give.

Simplicity, compactness, durability and fewer moving parts are characteristics of McKiernan-Terry construction. All the moving parts are entirely enclosed.

This hammer is so designed that all forms of sheeting and piling can ordinarily be driven without a cap or block to protect the top. This is a distinct advantage, as any device interposed between anvil block and piling tends to cushion the blow of the ram and thus lessen its effectiveness.

The strokes per minute given below should not be exceeded.

When ordering hammer sizes 9-B-3, 10-B-3 or 11-B-3, specify whether flat or bell bottom anvil block is wanted.

The B-3 hammers can be used for underwater driving.

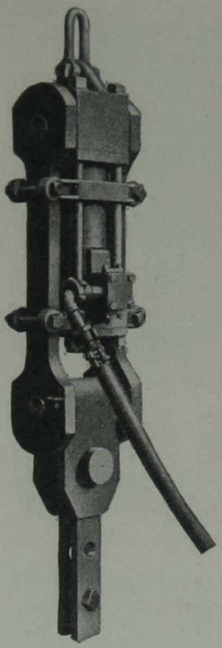
Size of Hammer	Bore Inches	Stroke Inches	Strokes per Min.	Energy per Blow Ft. Lbs.	Boiler H.P. Required	Compressed Air, Actual Cu. Ft.	Size Hose In.
0	2¼	4½	1000	*	5	60	¾
1	2¼	3¾	500	*	10	70	¾
2	4¹⁄₁₆	5¼	500	*	10	70	¾
3	3¼	5¾	400	*	15	110	1
5	7	7	300	1000	20	250	1¼
6	9¾	8¾	275	2500	25	400	1¼
7	12½	9½	225	4150	35	450	1½
9-B-3	8½	17	145	8750	45	600	2
10-B-3	10	19	105	13100	50	750	2½
11-B-3	11	19	95	19150	60	900	2½

Size of Hammer	Size Wood Sheeting, In. Square or Round	Penetra Material Feet	Size Sheet Steel Piling, In.	Penetration in Average Material Feet	Ram Weight Pounds	Shipping Weight Pounds
0	2x10	3–4	9	5–6	5	135
1	2x10	4–6	9	6–10	21	185
2	3x8	6–10	9	10–15	48	380
3	3x12	6–10	12	10–15	68	735
5	4x12	10–15	12	15–20	200	1560
6	6x12	15–20	12	20–30	400	2970
7	10x14	20–30	Largest	30–40	800	5075
9-B-3	17	30–40	Largest	50–60	1600	7100
10-B-3	20	50–70	Largest	60–80	3000	11000
11-B-3	21	60–80	Largest	70–100	5000	14200

*Figures cannot be given, because of the high speed of this machine.

Prices upon application.

McKiernan-Terry Double-Acting Pile Extractors



Built ruggedly to stand up under severe service. In addition to exceptional power and sturdiness, the design of these extractors includes the means necessary for quickly connecting up to the pile, placing it where desired after extraction, and disconnecting the pile without loss of time.

The high frequency and force of the sharp uncushioned blows of a McKiernan-Terry Pile Extractor vibrates and loosens the most stubbornly set piling.

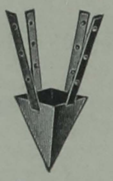
Economic extraction of piling is dependent upon the combination of vibration and a continuous pull on the member to be removed. For the average run of work, the No. E2 extractor is recommended; but for stubbornly set piling the No. E4 extractor should be used.

Steam or air pressure should not exceed 125 pounds gauge pressure.

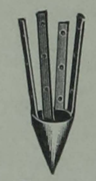
No.	Bore In.	Stroke In.	Strokes per Min.	Air Consumption Cu. Ft. per Min.	Hose Connections In.	Wt., Lbs. Extractor and Attachment	Wt., Lbs. Ram
E2	7	3	450	400	1½	2600	200
E4	9	3	400	550	1½	4400	400

Prices upon application.

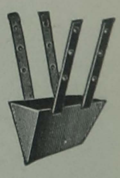
Pile Points or Shoes



Square



Round

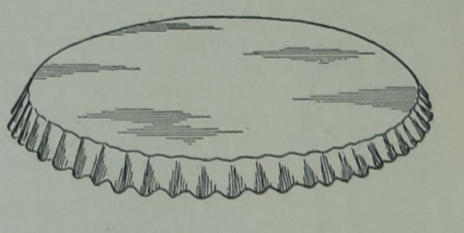


Wedge

Made of chilled cast iron, straps being placed in the mold before pouring so that when the molten metal cools they are firmly imbedded in the casting. They facilitate penetration of the pile in difficult ground. Prices include spikes.

Size, In.	Style	Price, Each	Size. In.	Style	Price, Each
4	Square	**$1.35**	**10**	Round	**$9.00**
5	"	**2.25**	**9x2½**	Wedge	**1.75**
6	"	**2.60**	**9x3**	Wedge	**2.40**
6	Round	**2.60**	**9x3½**	Wedge	**2.85**
8	"	**5.00**	.....	......	....

Galvanized Steel Pile Protectors

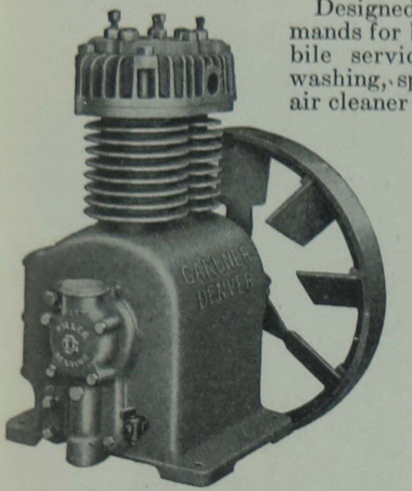


Generally made from 20-gauge galvanized iron 12 inches inside diameter; with crimped edges.

Installed on top of piling, these caps keep water from soaking into pile, preventing rot.

Weight, 4 Pounds................................each **$.75**

Gardner-Denver Duplex Single Stage Air-Cooled Compressors



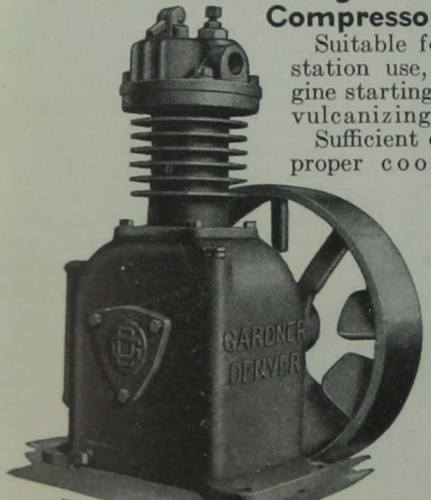
Designed to meet modern demands for bus, truck, and automobile services, such as greasing, washing, spray painting, etc. The air cleaner makes it possible to operate compressor in places where dust is a menace.

A controlled type of splash lubrication is employed; the plunger pump on outside of crankcase maintains a constant level of filtered oil in oil troughs which are cast in the crankcase under connecting rods. Cooling vanes in cylinders.

Shipping weights given are approximate.

Size, Diam. Cylinder and Stroke...in.	**3x3½**	**3½x4**
Displ. at Max. Speed...cu. ft. per min.	22.9	31.2
Displ. at Min. Speed...cu. ft. per min.	8.6	13.4
Maximum Pressure...lbs.	150	150
Maximum R.P.M.	800	700
Minimum R.P.M.	300	300
Brake H.P. at Max. Speed:		
75 Lbs. Air Pressure	4.0	5.7
100 Lbs. Air Pressure	4.6	6.0
125 Lbs. Air Pressure	4.8	6.3
150 Lbs. Air Pressure	5.0	6.6
Suction and Discharge...in.	¾	1
Pulley Inches, Diam...in.	16½	16½
Size Belt...in.	3	3½
Floor Space, Lgth., Width, Height.in.	16½x17½x23	16½x19½x27
Ship. Wt., with Tight Pulley Only.lbs.	225	290
Ship. Wt. with T. & L. Pulley....lbs.	255	330

Gardner-Denver Single Stage Air Cooled Compressors



Suitable for garage and service station use, paint spraying, engine starting, sprinkler systems, vulcanizing plants, etc.

Sufficient cooling area to insure proper cooling in the hottest climates.

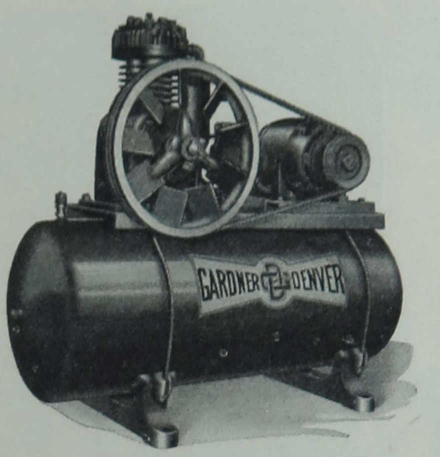
The 3x3½-inch compressor differs in construction from the other machines; although of the single cylinder type, its detailed construction is similar to the duplex single stage compressors.

Maximum pressure: 2x1¼-inch, 125 pounds; other sizes, 150 pounds.

Size...inches	**2x1¼**	**2x2½**	**2¾x2½**	**3x3½**
With Tight Pulley...each	**$26.60**	**$34.50**	**$35.75**	**$47.00**
With T. & L. Pulley....each	**30.15**	**40.00**	**41.25**	**54.00**
Maximum Speed...r.p.m.	800	800	800	800
Minimum Speed...r.p.m.	500	400	400	300
Cap., Max. Spd. per M. cu.ft.	1.8	3.6	6.9	11.4
Cap., Min. Spd. per M..cu.ft.	1.1	1.8	3.5	4.3
H.P.Req'd,100 Lbs.per sq. in.	.37	.67	1.3	2.4
H.P.Req'd,150 Lbs.per sq. in.	*48	.78	1.5	2.6
Suction Opening...inches	⅜	⅜	½	¾
Discharge Opening....inches	⅜	⅜	½	¾
Diameter Pulley...inches	7	12	14	16⅜
Width of Belt...inches	1½	2	2	2½
Floor Space Required..inches	7x9	12x8	12x8	14x12
Ship. Wt., Tight Pulley..lbs.	38	50	60	130
Ship. Wt., T. & L. Pulley.lbs.	45	60	70	160

*For intermittent service only and at minimum speed.

Gardner-Denver Single Stage Air Cooled Automatic Compressor Outfits



Compressor is of the single-acting vertical type. Each cylinder is provided with cooling fins, having unusually large radiating surfaces which insure proper cooling. Water jackets are eliminated; no danger of broken cylinders in freezing weather.

All parts that require adjustment are easily accessible by removing handhole plate on crankcase. In a small compressor simplicity of construction is of paramount importance.

Lubrication.—A controlled type of splash lubrication assures an adequate amount of oil for all working parts.

Cylinders.—Close grained grey iron, accurately machined, bored and honed to a mirror-like finish. Clearance has been reduced to the minimum to obtain high volumetric efficiency.

Air Valves.—Plate type air valves are located in cylinder head. Both suction and discharge valves are flat discs of special rust-resisting steel, heat treated and ground, and placed in separate pockets so intake air is not heated when entering cylinder.

Pistons.—Light weight automotive type with 3 compression rings and one oil ring.

Connecting Rods.—Automotive type connecting rods drop forged and heat treated with centrifugally spun babbit crank pin bearings, adjustable by means of shims.

Crankshaft.—Balanced, drop forging with counterweights forged integral.

Driving Pulley.—Fan type with crowned face for flat belt drive is regularly supplied.

Main Bearings.—Roller type; easily accessible and may be replaced if they become worn or damaged.

Unloader.—A suction valve unloader with unloader pilot for constant pressure control, may be furnished at an extra charge.

Each complete automatic compressor outfit is composed of the following equipment: Compressor, motor, V-belt drive, air receiver for 175 pounds working pressure, automatic start and stop control, with pressure and moisture unloader, check valve, safety valve and pressure gauge for air receiver, needle valve for discharge line, and 20 feet of high grade ¼-inch air hose with tire chuck. Compressor, motor and control equipment are mounted on a metal base on top of air receiver. All sizes have provision for tightening belt. Maximum pressure, 150 pounds; pressure range, 115–150 pounds.

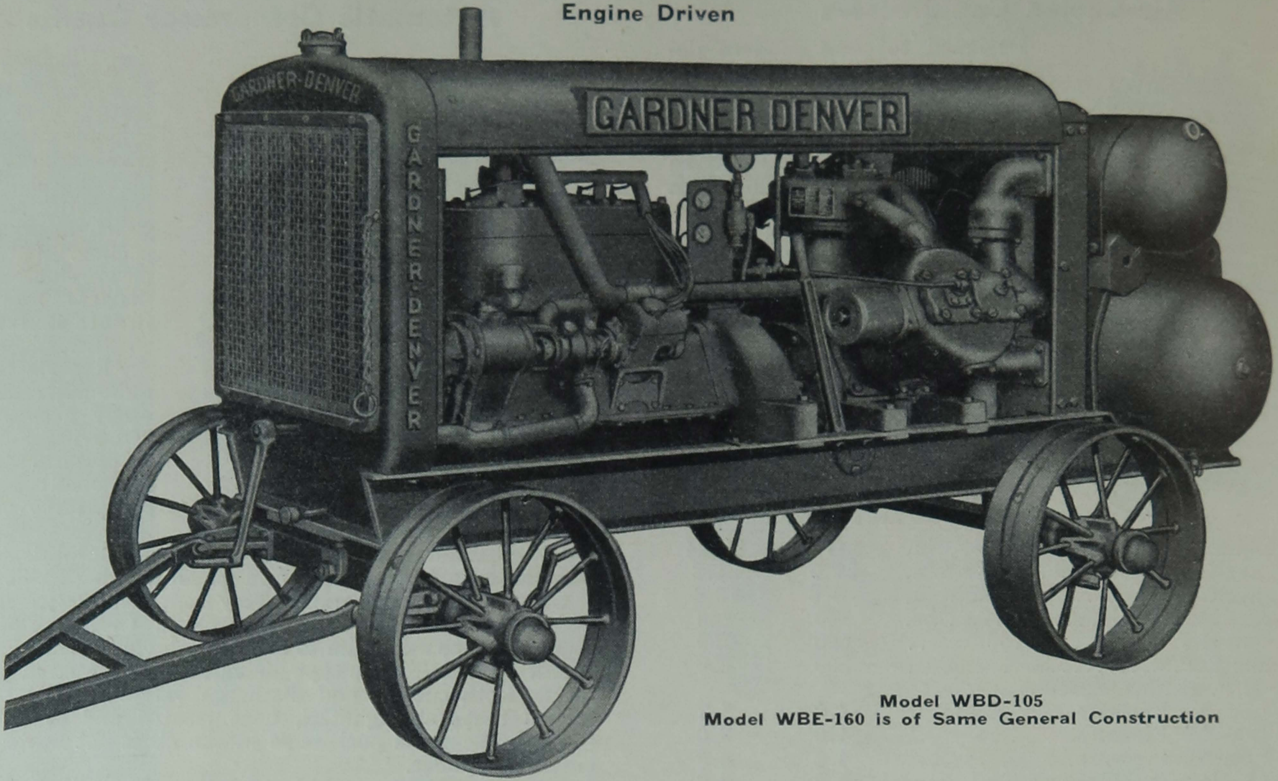
Single Cylinder Compressors

Displacement Cubic Feet per Min.	SIZE, IN.		Compressor Speed	Motor H.P. at Rated Speed	Size Air Receiver In.	Air Receiver Cap. U.S. Gals.	Min. to Fill Tank to Max. Press.	FLOOR SPACE			Ship. Wt. Lbs.
	Diam. of Cyl.	Stroke						Lgth. In.	Width In.	Ht. In.	
0.75	2	1¼	330	¼	12x36	17	53	42	15	35	300
1.0	2	1¼	420	⅓	12x36	17	40	42	15	35	320
2.61	2	2½	575	½	14x46	30	26	53	17	38	400
4.0	2¾	2½	460	¾	14x46	30	13	53	17	38	430
5.0	2¾	2½	580	1	14x46	30	9	53	17	38	450
7.86	3	3½	550	1½	20x48	65	20	58	22	46	780
10	3	3½	700	2	20x48	65	14	58	22	46	800
Duplex Compressors											
16	3	3½	550	3	20x48	65	10	58	24	48	1135
16	3	3½	550	3	20x60	81	12.5	68	24	48	1170
26	3½	4	600	5	20x48	65	5.6	58	26	57	1270
26	3½	4	600	5	20x60	81	7.	68	26	57	1300
26	3½	4	600	5	20x72	98	8.3	82	26	57	1400

Prices upon application.

Class WB Gardner-Denver 2-Stage Water-Cooled Portable Compressors

Engine Driven



Model WBD-105
Model WBE-160 is of Same General Construction

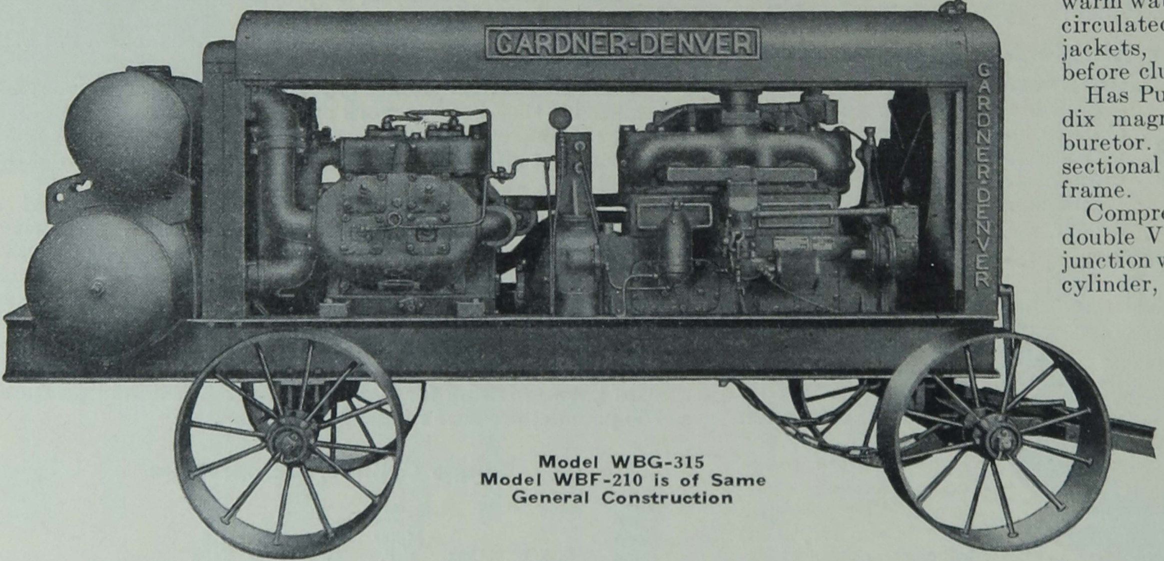
At 100 pounds gauge discharge pressure, a 2-stage compressor shows 15 per cent theoretical power saving per cubic foot of free air delivered, and at the same time delivers from 15 to 20 per cent more air than a single stage compressor of equivalent piston displacement, due to the cooling between stages. The air is cooler and drier with water-cooled cylinders and heads.

Engines being water-cooled, water jackets of engine and compressor are interconnected; warm water from engine may be circulated through compressor jackets, warming compressor before clutch is thrown in.

Has Purolator oil filter, Bendix magneto and Zenith carburetor. With twin disc clutch, sectional radiator, welded steel frame.

Compressors are of radial or double V design having in conjunction with each high pressure cylinder, two small low pressure cylinders. As low pressure pistons and connecting rods are of same weight and are opposed at an angle of 120°, forces tending to cause vibration are reduced.

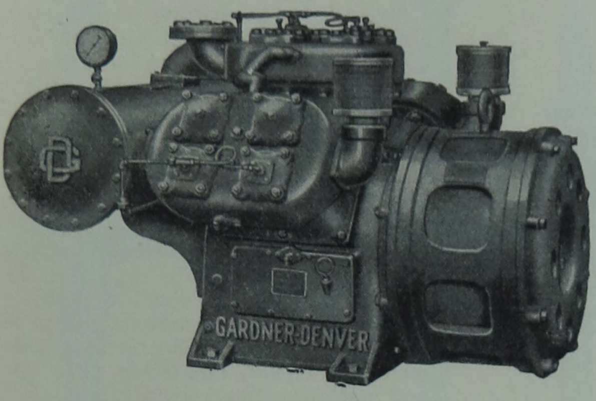
With solid rubber tire mounting and pneumatic tires or mounted on trailer or skids.



Model WBG-315
Model WBF-210 is of Same General Construction

Model No.		WBD-105	WBE-160	WBF-210	WBG-315
Compressor Bore (and Number of Cylinders) Low Pressure		5¾″ (2)	7″ (2)	5¾″ (4)	7″ (4)
High Pressure		4¾″ (1)	5¾″ (1)	4¾″ (2)	5¾″ (2)
Stroke	inches	5	5	5	5
R.P.M.		860	875	860	860
Actual Capacity per Minute	cubic feet	105	160	210	315
Working Air Pressure per Square Inch	pounds	100	100	100	100
Model of Buda Engine		H-326	BTH	FRH	JL877
Bore and Stroke of Engine	inches	3$\frac{13}{16}$x4¾	5x6½	5½x6½	6¼x7⅛
R.P.M. of Engine		860	875	860	860
Wheel Base	inches	68½	79	84¾	93
Size Air Receiver (A.S.M.E.)	inches	18x48	20x60	20x60	20x60
Capacity Gasoline Tank (U. S. Gallons)		26	40	40	40
Size Overall (Length x Width x Height)	inches	115x59x62	135x70x76	144x70x76	150x70x78
Net Weight, Steel Wheel Mounting	pounds	4000	6400	6400	8300

Class WB Gardner-Denver Vertical 2-Stage Water Cooled Compressors



The class WB compressor is for stationary use. When discharging against 100 pounds gauge pressure a 2-stage compressor shows a theoretical power saving of 15% per cubic foot delivered, while the volumetric efficiency is increased from 15 to 20% over that of a single staged compressor of the same piston displacement. At high altitudes, because of increased compression ratios, volumetric efficiency of a single stage compressor falls off rapidly, whereas volumetric efficiency of a 2-stage compressor remains practically constant. Suitable for high altitudes because of the very much greater air output than that obtained with single stage compressors of equivalent piston displacement. Also the temperature of discharge air will be much lower. R.p.m., 870, water inlet of pipe opening, 1¼ inches.

Has 2 small diameter low pressure cylinders in conjunction with each high pressure cylinder. The 3-cylinder compressors have 2 low and one high pressure cylinder; 6 cylinder machines, 4 low and 2 high pressure cylinders. This construction permits use of small, lightweight pistons for all cylinders and considerably reduces inertia loads. Use of 2 small water-cooled cylinders in each instance, where one large one is ordinarily used, results in lower air temperatures than previously obtained on small vertical compressors, with corresponding saving in h.p. By watercooling cylinder walls, lower wall temperatures are obtained, with better lubrication and longer life. Oil thinning is eliminated and consequently much less lubricating oil is used.

Driving motor is mounted directly on compressor shaft saving about half of the floor space usually required. Unit is compact, easy to install and requires practically no foundation. Compressor is well balanced, quiet and vibrationless. Because of the 2-stage construction, with water cooled cylinders and intercooler, sustained high efficiency is assured.

For special current conditions, or where it is desired to use available standard motors, compressors may be direct connected by means of a flexible flywheel coupling, or driven by means of V belt or flat belt drive.

3-Cylinder—Sizes and Ratings (Sea Level)

Piston Displace. Cubic Feet per Min.	*Actual Free Air Del. at 100 Lbs.	SIZE OF COMPRESSOR				Motor Rating H.P. (40° C.)	Lgth. In.	Width In.	Ht. In.	PIPE OPEN, IN.	
		LOW PRESS.		HIGH PRESS.							
		No.	Bore and Stroke In.	No.	Bore and Stroke In.					Suction (2)	Discharge (1)
142	115	2	6x5	1	4¾x5	25	47	50	38	2½	2
194	156	2	7x5	1	5¾x5	40	50	54	41	3	2½

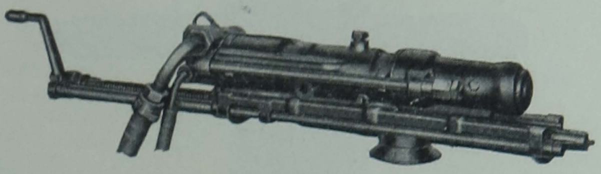
6-Cylinder—Sizes and Ratings (Sea Level)

285	230	4	6x5	2	4¾x5	50	60	50	38	2½	2½
387	313	4	7x5	2	5¾x5	75	62	56	42	3	3
445	360	4	7½x5	2	5¾x5	75	62	56	42	3	3

*Ratings are intended for average conditions and are conservative. Higher volumetric efficiencies may be obtained when conditions require them. Communicate with the factory when higher volumetric efficiencies than those shown are required.

Prices upon application.

No. D-79 Gardner-Denver Drifting Drills



No. D-79 has been developed for varying conditions of service, including general mine use, tunnelling, quarrying and construction work. It is the lightest of the "9" series and is an ideal one man drill. It can be equipped for wet or dry drilling and may be mounted on either a movable cone guide shell or a standard guide shell. It is particularly adapted for drifting or cross-cutting in soft and medium formations where high drilling speed and light weight are essential.

For dry drilling in soft formations, No. D-79 can be equipped with a blow valve regulator which passes additional blowing air through an air tube directly to the steel. The amount of air may be regulated by the operator and deep holes can be easily drilled.

Bore	in.	**3**
No. D-79	each	**$370.00**
Size Steel Recommended	in.	1-1¼ Rd. Hollow
Size Air Hose Recommended	in.	¾
Size Water Hose Recommended	in.	½
Weight Mounted	lbs.	128

No. D-89-B Gardner-Denver Drifting Drills

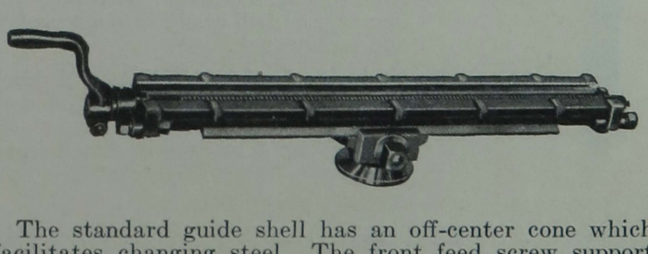
No. D-89-B has been developed for varying conditions of service, including general mine use, tunnelling, quarrying and construction work. It is a medium weight drifter suitable for use in all ordinary formations. It is furnished in either wet or dry construction and may be mounted on any type of mounting. It has exceptional hole cleaning ability and powerful rotation which permits the drilling of deep holes.

The D-89-B has been developed for drilling in formations requiring exceptional hole cleaning ability.

Can be furnished with spring handles for sinking.

Bore	in.	**3½**
No. D-89-B	each	**$385.00**
Size Steel Recommended	in.	1-1¼ Rd. Hollow
Size Air Hose Recommended	in.	¼
Size Water Hose Recommended	in.	½
Weight Mounted	lbs.	149

Gardner-Denver Guide Shells

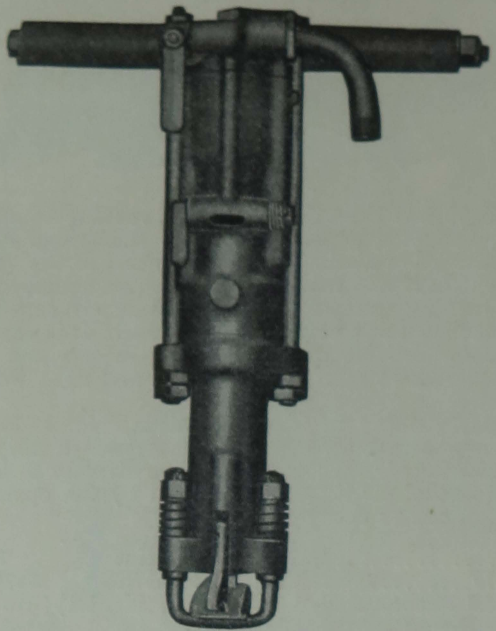


The standard guide shell has an off-center cone which facilitates changing steel. The front feed screw support is of dirt-proof construction. The feed screw is made of alloy steel, heat-treated, and will give long service even when drilling in highly abrasive material.

Adjustable and solid cone guide shells of varying lengths are available for each model of drifting drill.

Prices on application.

No. S-45 Gardner-Denver Drills



A fast, powerful, hand held drill of simple and sturdy construction. Its field is in block holing, where the air supply is limited, or where the ground is soft, badly broken, or uneven. Will handle steels up to 12 feet in length under average conditions.

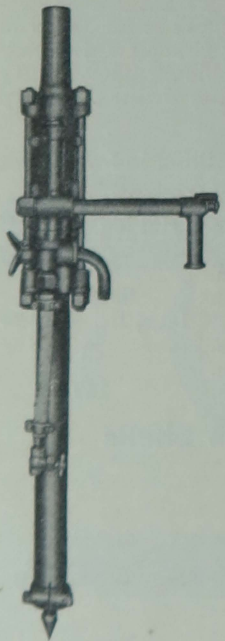
The valve assembly is enclosed in the cylinder counterbore. Long bearing rifle bar, cylinder bushing, integral oil reservoir, and an exceptionally sturdy steel puller which is easily operated. Four-pawl rotation.

Made in the wet, dry and blowing types.

Weight, 45 pounds.

No. S-45, Dry	each	**$180.00**
No. S-45W, Wet	each	**205.00**

No. H-81 Gardner-Denver Stopers



The No. H-81 is a hand rotated stoper. It combines high drilling speed, low air consumption and minimum upkeep cost, and is to be recommended for routine mining where the rock is not excessively hard.

The hammer is single diameter, reversible, block type construction.

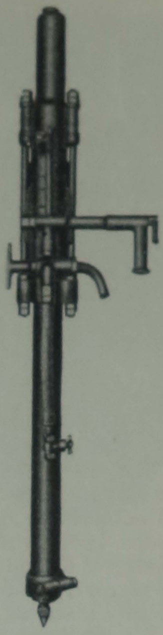
The valve is the tubular, long bearing Gardner-Denver valve, and is located in the rear of the cylinder.

The air feed is controlled independently of the throttle valve by means of an air feed control located in the end of rotating handle. This feed control permits air to be exhausted from the feed cylinder and prevents air from being admitted, enabling the operator to drill easily through broken and seamy rock.

May be furnished with a solid chuck end for any standard section of drill steel or may be furnished with a chuck end having a renewable chuck liner, which may be replaced as wear occurs.

Diameter of Feed Cylinder	in.	**2⅜**
No. **H-81**	each	**$255.00**
Air Hose Recommended	in.	¾ or 1
Water Hose Recommended	in.	½
Drill Steel Recommended	in.	⅞ to 1
Maximum Change of Steel	in.	18
Length Over All, Feed Piston Closed	in.	54¾
Length Over All, Feed Piston Extended	in.	78¾
Shipping Weight	lbs.	125

No. R-111 Gardner-Denver Stopers



The R-111 has drilling power and speed comparable to the drifting drills that would be used in a given formation. It is self-rotating and is designed to drill in the hardest rock formations.

The chuck is held in the chuck driver by splines having ample bearing surface. The chuck parts are kept free from sludge and dirt by exhaust air conducted through special ports around the tappet and into the chuck. Rotation of the chuck sleeve is effected by an easily renewable bronze nut screwed into the chuck driver.

The rotation is accomplished by means of a ratchet ring, rifle bar, bronze rifle nut and 4 pawls. The pawls are reversible and maintenance on them is negligible.

The feed leg construction is used on No. R-111. The feed piston has a renewable point and 2 cup leathers. The feed cylinder is assembled with a heavy yoke through which the double ended side rods pass. A renewable guide bushing is held in place by a threaded clamping nut.

The side rods are double ended and the chuck end and feed cylinder yoke have long tunnel ways to aid in alignment. The lower side rod nuts may be removed to renew the water tube without disturbing the cylinder, backhead and chuck end assembly.

This stoper is lubricated from an integral reservoir. Separate metering devices are used for the chuck end parts, and for the valve and hammer action. This division of the oil from the reservoir insures that each moving part will receive adequate lubrication.

The feed control button is conveniently located in the end of the holding handle. When the feed control button is pushed inward, the machine is held in a stationary position and neither raises or lowers on the feed leg. When rotated slightly, the pressure on the feed leg is reduced.

Stop rotation may be supplied when desired. Stop rotation is particularly useful when drilling in abrasive ground as it is possible to drive an oversize bit to the bottom of the hole without rotation.

No. R-111 can be furnished with chucks for lugged shanks. The length of the lugged shanks is so short that this construction is not recommended.

Diameter of Feed Cylinder	in.	**2$\frac{11}{16}$**
No. R-**111**	each	**$385.00**
Air Hose Recommended	in.	¾ or 1
Water Hose Recommended	in.	½
Drill Steel Recommended	in.	1 Hex. or Q.O.
Maximum Change of Steel	in.	18
Length Over All, Feed Piston Closed	in.	62
Length Over All, Feed Piston Extended	in.	86
Shipping Weight	lbs.	159

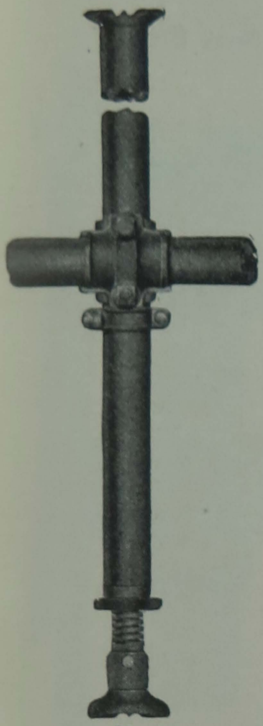
S-55 Gardner-Denver 55-Pound Sinkers

Especially adapted to general rock excavation, road work, construction and quarry work, and shaft sinking. Can be mounted in a guide shell for drifting and can be supplied in either wet or dry construction. Suited for holes up to 15 or 18 feet deep. Size steel ⅞ to 1¼ inches round; size air hose ¾ inch.

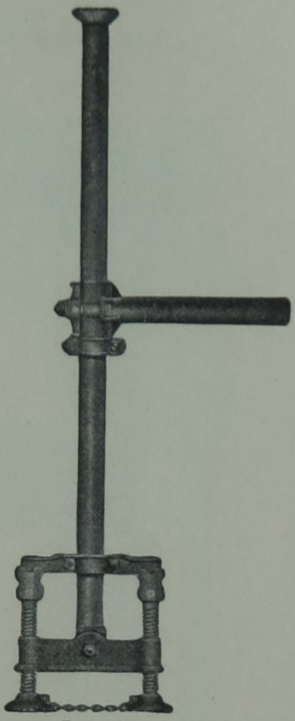
Approximate weight, 56 pounds.

Description	Wet Each	Dry Each	Lgth. In.
With ⅞-In. Hex. x 3¼-In. Chuck	**$215.00**	**$190.00**	22⅝
With 1-In. Hex. x 4¼-In. Chuck	**215.00**	**190.00**	23⅜
With Tappet Chuck	**215.00**	**190.00**	24¾
With Lug Shank Chuck	**215.00**	**190.00**	23½

Gardner-Denver Screw Columns



Single



Double

Size Inches	Single: Complete Each	Single: With Safety Clamp Only	Double: Complete Each	Double: With Safety Clamp Only
3	**$76.00**	**$46.00**	**$80.00**	**$50.00**
3½	**93.00**	**55.00**	**93.00**	**55.00**
4	**102.00**	**58.00**	.....	.....

Gardner-Denver Automatic Air Line Oilers

GARDNER-DENVER
GDC
COMPANY

A simple and trouble-proof oiler. The only attention required is to see that it is filled at beginning of shift. While the machine is in operation, it supplies an ample quantity of finely atomized oil for all moving parts. When air is shut off the flow of oil is also stopped and the oil will not siphon into the line. Will operate in any position. The nozzle can be readily adjusted to opening for correct rate of feed.

Size No.	LO7	LO8	LO9
Each	**$11.00**	**8.00**	**8.00**
Oil Capacity...pts.	1	½	½
Cubic Feet per Min.	100–450	50–200	20–75
Service	Large Drills	Small Drills	Air Tools
Weight.........lbs.	11	6¼	6½

Engineering Service

We can place at your disposal experienced engineers who will cooperate with you in the selection and installation of power transmission, material handling and other engineering lines.

Data sheets, catalogues and other detailed information will be supplied on request.

Gardner-Denver Air or Gas Receivers and Pressure Tanks

A.S.M.E. Code

Receivers are furnished complete with safety valves, pressure gauges, and drain cocks.

When receivers are sold with compressors, the inlet opening of the tank should be the same size as the compressor discharge.

The sizes given for inlet and outlet air openings are maximum. If special openings smaller than standard are wanted, it should be ordered, so that reducers can be furnished. A short delay in shipment will be necessary in this case.

Where air storage tanks are to be selected for use in connection with automatic start and stop control, the receiver should be at least double the capacity shown in the below table. The receivers are rated for continuous operation of compressors equipped with regular unloaders.

For prompt and accurate delivery, the order must be made out definitely and clearly. Advise whether receiver is to be mounted in vertical or horizontal position. Sizes 42 inches x 10 feet and smaller are furnished for vertical mounting; 48 inches x 12 feet and larger, for horizontal mounting, unless otherwise specified. Give working pressure so that safety valves can be set at proper blow-off pressure. Unless otherwise specified, all safety valves will be set for the working pressure shown below and will be of no protection to a low pressure compressor. Be sure to select receiver sizes with openings as large or larger than the compressor discharge openings. Never reduce the size of the compressor discharge pipe.

It is the plan of the American Society of Mechanical Engineers to have their code for Unfired Pressure vessels accepted by all states, insurance companies and municipalities, the object being to have all tanks of uniform construction specifications. It must be assumed that, until further notice, Standard A.S.M.E. receivers are not accepted in Massachusetts, or the United Kingdom of Great Britain including its colonies and dominions.

The below prices hold on all pressures up to 125 pounds gauge. For special sizes, use price of next larger standard size.

No.	*A.S.M.E. Std. Each	Diam. In.	Length Ft.	Work. Press. Lbs.	**Compressor Capacity Lbs.	Approx. Contents Cubic Ft.	Approx. Wt. Lbs.
B-1	**$30.00**	12	3	150	30	2.4	90
B-2	**36.00**	14	4	150	60	4	125
R-3	**55.00**	18	6	150	95	11	410
R-4	**85.00**	24	6	125	185	19	725
R-5	**110.00**	30	7	125	305	35	960
R-6	**150.00**	36	8	125	450	57	1475
R-7	**240.00**	42	10	125	640	96	2400
R-8	**315.00**	48	12	125	1275	152	3900
R-9	**400.00**	54	14	125	1900	224	5000
R-10	**440.00**	60	14	125	3000	254	6075
R-11	**580.00**	66	18	125	3000 Upward	396	8375

No.	Thick. of Shell In.	Thick. of Top Head In.	Thick. of Bottom Head In.	No. of Safety Valves	Diam. of Safety Valves In.	Diam. of Inlet and Outlet Openings In.	Type of Openings for Cleaning
B-1	1/8	9/64	9/64	1	½	†1½	None
B-2	1/8	9/64	9/64	1	¾	†1½	2 Handholes near Head
R-3	3/16	17/64	3/16	1	1	†3	2 Handholes near Head
R-4	¼	3/8	¼	1	1½	†3	Manhole in Top Head
R-5	¼	7/16	17/64	1	2	†4	Manhole in Top Head
R-6	19/64	7/16	5/16	1	2½	†6	Manhole in Top Head
R-7	23/64	½	23/64	1	3	†6	Manhole in Top Head
R-8	13/32	9/16	13/32	2	3	‡8	Manhole in Top Head
R-9	3/8	9/16	7/16	3	3	‡10	Manhole in Top Head
R-10	13/32	½	½	3	3	‡10	1 Manhole in Shell
R-11	7/16	9/16	9/16	3	3	‡10	1 Manhole in Shell

*Built in strict accordance with the American Society of Mechanical Engineers Boiler Construction Code for Unfired Pressure Vessels, section 8. Sizes with letter B are brazed; with letter R, riveted.

**Based on actual air delivered up to rated working pressures. Compressor capacity ratings that tanks may be used for should not be exceeded more than 10%. The ratings are set by the American Society of Mechanical Engineers.

†Screwed openings furnished. ‡Flanged openings furnished.

Timken Rock Drill Bits

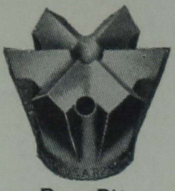
Cross Bit Center Hole

Cross Bit Side Hole

Cross Bit Center Hole Heavy Duty Type

Chisel Bit Center Hole

Rose Bit Center Hole


Rose Bit Side Hole

B and B-SH Series Cross Bits

Drill Steel Sizes, In.	Each	Bit Gage In.	Part No. Center Hole	Part No. Side Hole
⅞ Hex. ⅞ Thread Diameter	$.28	1¼	A-1¼	A-SH-1¼
⅞ Hex.	.28	1⅜	B-1⅜	B-SH-1⅜
⅞ Quarter	.30	1½	B-1½	B-SH-1½
Octagon	.31	1⅝	B-1⅝	B-SH-1⅝
1 Round	.31	1¾	B-1¾	B-SH-1¾
1 Hex.	.32	1⅞	B-1⅞	B-SH-1⅞
1 Quarter	.32	2	B-2	B-SH-2
Octagon	.32	2⅛	B-2⅛	B-SH-2⅛
1⅛ Round	.34	2¼	B-2¼	B-SH-2¼
1 Thread	.36	2⅜	B-2⅜	B-SH-2⅜
Diameter	.38	2½	B-2½	B-SH-2½
	.40	2⅝	B-2⅝	B-SH-2⅝

D Series Center Hole Cross Bits
Heavy Duty Type

Drill Steel Sizes, In.	Each	Bit Gage In.	Part No.
	$.32	1¾	D-1¾
	.33	1⅞	D-1⅞
	.34	2	D-2
1 Quarter	.36	2⅛	D-2⅛
Octagon	.38	2¼	D-2¼
1⅛ Round	.40	2⅜	D-2⅜
1¼ Round	.42	2½	D-2½
1 3/16 Thread	.44	2⅝	D-2⅝
Diameter	.46	2¾	D-2¾
	.49	2⅞	D-2⅞
	.52	3	D-3

J Series Center Hole Chisel Bits

Drill Steel Sizes, In.	Each	Bit Gage In.	Part No.
⅞ Hex.	$.28	1⅜	J-1⅜
⅞ Quarter	.30	1½	J-1½
Octagon	.31	1⅝	J-1⅝
1 Round	.31	1¾	J-1¾
1 Hex.	.32	1⅞	J-1⅞
1 Quarter	.32	2	J-2
Octagon	.32	2⅛	J-2⅛
1⅛ Round	.34	2¼	J-2¼
1 Thread	.36	2⅜	J-2⅜
Diameter	.38	2½	J-2½
	.40	2⅝	J-2⅝

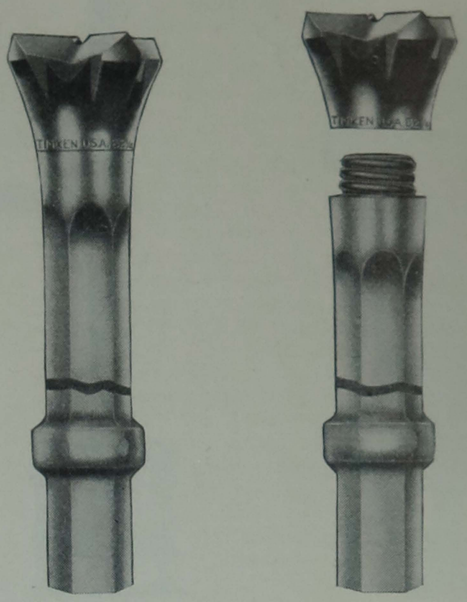
R and R-SH Series Rose Bits

Drill Steel Sizes, In.	Each	Bit Gage In.	Part No. Center Hole	Part No. Side Hole
⅞ Hex.	$.28	1⅜	R-1⅜	R-SH-1⅜
⅞ Quarter	.30	1½	R-1½	R-SH-1½
Octagon	.31	1⅝	R-1⅝	R-SH-1⅝
1 Round	.31	1¾	R-1¾	R-SH-1¾
1 Hex.	.32	1⅞	R-1⅞	R-SH-1⅞
1 Quarter	.32	2	R-2	R-SH-2
Octagon	.32	2⅛	R-2⅛	R-SH-2⅛
1⅛ Round	.34	2¼	R-2¼	R-SH-2¼
1 Thread Diameter	.36	2⅜	R-2⅜	R-SH-2⅜

D and J Series Side Hole Bits, same price as Center Hole.

Hollow Drill Steel

For Use with Timken Rock Bits



When Timken Rock Bits are used, much less steel is required on a job, thus cutting down capital investment and carrying charges. The average length of drill steel, which is between 4 and 6 feet, weighs 15 pounds. If the conventional bit lasts 30 minutes, and 24 hours are required to re-forge and heat treat, 32 lengths of drill steel must be in circulation to supply a driller through an 8 hour shift. In many cases the life of the bit is less than 10 minutes, and the re-forging cycle is 72 hours.

On the basis of the above figures, a considerable investment is required to keep one driller supplied with steel through an 8-hour shift. With Timken Rock Bits this figure can easily be reduced to a small fraction.

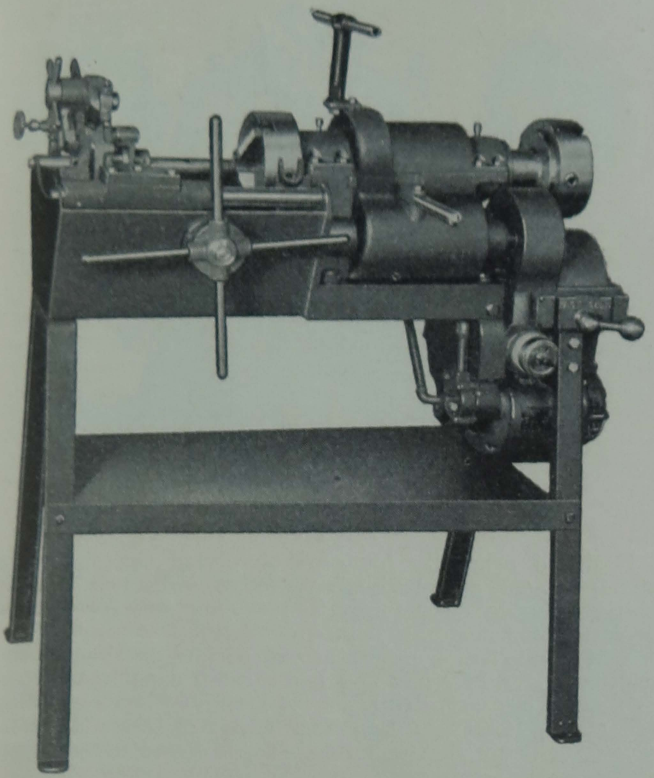
B threads fit B, J, and R bits.

*Steel Thread Shank Length Inches	⅞-In. Hex. B Col'd. Each	⅞-In. Hex. B Stoper Each	1-In. Hex. B Col'd. Each	1-In. Hex. B Stoper Each	⅞-In. Q.O. B Stoper Each	1-In. Q.O. B Stoper Each	1⅛-In. Round B Lug Each	1¼-In. Round D Lug Each
12	$1.95	....	$2.20	....	....	....	$2.75	$2.80
18	2.25	$2.10	2.50	$2.35	$2.15	$2.45	.....	.....
24	2.40	2.25	2.75	2.60	2.30	2.75	3.35	3.60
30	....	2.50	....	2.90	2.55	3.05	....	....
36	2.85	2.70	3.30	3.15	2.80	3.35	4.00	4.40
42	....	2.95	....	3.45	3.05	3.65	....	....
48	3.30	3.15	3.85	3.70	3.25	3.95	4.60	5.20
54	....	3.40	....	4.00	3.50	4.25	....	....
60	3.75	3.60	4.40	4.25	3.75	4.55	5.25	6.00
66	....	3.85	....	4.55	4.00	4.85	....	....
72	4.20	4.05	4.95	4.80	4.20	5.15	5.85	6.80
96	5.10	4.95	6.05	5.90	5.15	6.35	7.10	8.40
120	6.00	5.85	7.15	7.00	6.10	7.55	8.35	10.00
144	6.90	6.75	8.25	8.10	7.05	8.75	9.60	11.60
168	7.80	....	9.35	....	....	....	10.85	13.20
192	8.70	....	10.45	....	....	....	12.10	14.80
216	9.60	....	11.55	....	....	....	13.35	16.40
240	10.50	....	12.65	....	....	....	14.60	18.00

B Threads Put on Steel	each	$.75
D Threads	each	1.00
Collared Shank	each	.75
Lug Shank	each	1.00
Stoper Shank	each	.60

*Drilling length exclusive of shank.

Toledo Rock Drill Rod Machines



This Toledo Rock Drill Rod Machine is a fast, highly efficient machine that will turn, neck, face, chamfer and thread rock drill rods, and readily renew broken rods for Crucible, Ingersoll-Rand and Timken detachable bits. It will handle this work easily, quickly and produce finished rods that will fit these detachable bits perfectly. The floor to floor time, which includes chucking, and the 5 operations of turning, necking, facing, chamfering and threading the ⅞-inch rod for Timken detachable bits, is less than 4 minutes. A large size rod such as 1$\frac{3}{16}$ inch can be finished every 5½ minutes. Crucible "Crusca" rods and Ingersoll-Rand Jack-Bit rods can be finished in even less time because of the smaller amount of turning to be done.

A specially designed cutter head has 4 combination turning, facing and forming tools all cutting simultaneously and fed by means of a hand feed wheel. An adjusting screw permits the separate adjustment of each turning tool so that all will be cutting the same amount of stock.

The dies and turning tools are made of high speed steel and can be easily removed and reground when dull.

Rack and pinion with carriage feed wheel enables the operator to easily control the operation of the machine.

The ½ h.p. motor is ball bearing and can be furnished either for 60 cycle a.c. 110 or 220 volt single phase or 3 phase current.

The oil pump is centrifugal type, built into the machine. It has neither release or check valves and is easily accessible for cleaning.

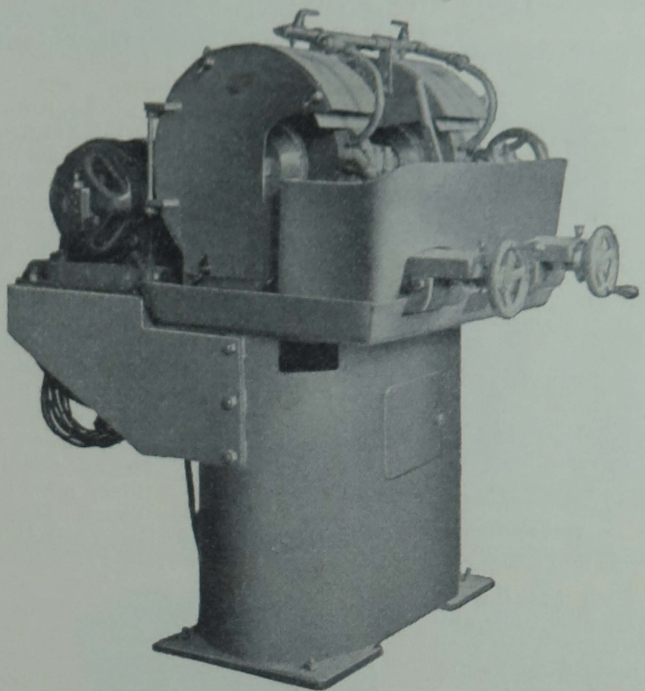
The machine occupies floor space 40x22 inches and is 51 inches high.

Furnished complete with 3 die heads and dies as may be specified by the purchaser; 1 set of forming tools as specified; cable; necessary wrenches; and 1 gallon of black sulphur base thread cutting oil. Extra sets of dies and forming tools can be furnished as required at additional price. A rod support for holding the end of long lengths of rods can also be furnished as an extra.

When ordering machine, forming tools or dies, always specify whether Crucible, Ingersoll-Rand or Timken bits, and the size of rod and type of thread to be produced.

Complete, Ship. Weight, 725 Pounds...........each	**$500.00**
1 Set Forming Tools, Ship. Weight, 1 Pound....each	**4.00**
1 Set Dies (Any Size to 1¼ Inches), Ship. Weight, 1 Pound....................................each	**8.50**
1 Die Head, No Dies, Ship. Weight, 3 Pounds...each	**5.00**
1 Rod Support, Ship. Weight, 30 Pounds......each	**7.50**

Massco Rock Bit Grinders



The Massco Rock Bit Grinder is a heavy duty tool built to give greater efficiency and more speed for resharpening all makes and styles of detachable rock bits.

Superior performance, faster sharpening speed and lower rock bit sharpening costs are outstanding features proven through actual service. Rugged construction assures long life with a minimum of maintenance expense.

The 18-inch grinding wheels—one single bevel faced for gage grinding and the other a double bevel for face grinding are 22 inches apart, so 2 operators can work side by side; one to gage the bits while a second grinds the faces. All grinding is done in plain view of the operator.

Specially designed holders permit a quick change of bits and the screw feed adjustment enables the operator to produce re-ground bits of the same accuracy as new ones.

All grinders are equipped with a wheel dresser holder for maintaining the grinding wheels at the correct pitch.

Two models are available—the Massco Rock Bit Grinder, lighter in construction with lower first cost and the Massco Super Rock Bit Grinder with more rugged construction to assure long life and uninterrupted continuous service for the larger mines. Both models may be had in either the stand or bench types with flat or V-belt drives.

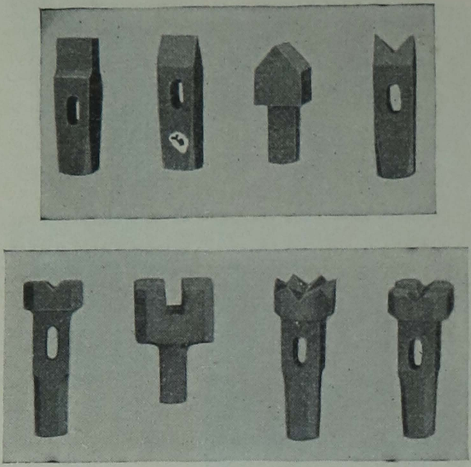
Stand Types D and G are motor driven V-belt machines complete with steel water tanks and pumps.

Complete details, specifications and prices upon request.

THE MASSCO ROCK BIT GRINDER is another specialty product developed by the Mine and Smelter Supply Company to fill a need in the Mining Industry for a production rock bit sharpening machine.

THE MINE AND SMELTER SUPPLY COMPANY has also developed other recognized standard equipment such as the Marcy Ball Mill, Marcy Rod Mill, Wilfley Concentrating Table, McCool Pulverizer, Clark-Todd Amalgamating Process and the G-B Portable Placer Machine.

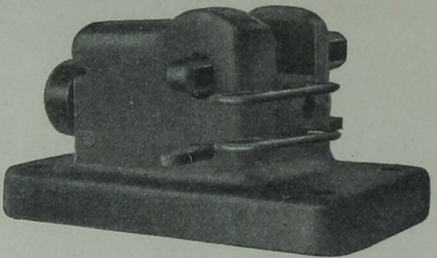
Waugh Gardner Denver Hand Sharpening Tools and Collaring Device



Waugh Hand Sharpening Tools

When rock drilling operations are of an intermittent nature, and of small extent so that only a moderate supply of steel drills is required, a large investment in forging and sharpening equipment is not justifiable.

To meet these conditions, a set of Waugh Hand Sharpening Tools and a Waugh Collaring Device will be found effective.



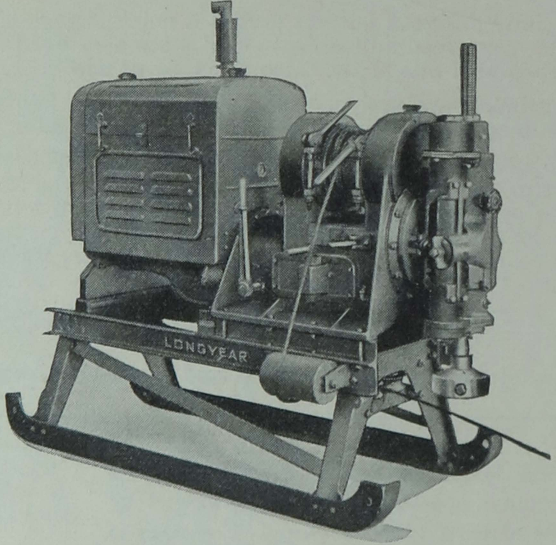
Waugh Collaring Machine

With the hand sharpening tools, any blacksmith can keep a limited number of bits in condition.

For collaring hollow drill steel by hand methods, the Waugh Collaring Device is most practical.

Price, Set of Waugh Hand Sharpening Tools....each	$21.50
Price, Waugh Collaring Device................each	75.00

Model UG Longyear Straitline Diamond Core Drills



This drill provides direct transmission of power from the motive unit to the drill. A smooth running machine without loss of energy through play or backlash.

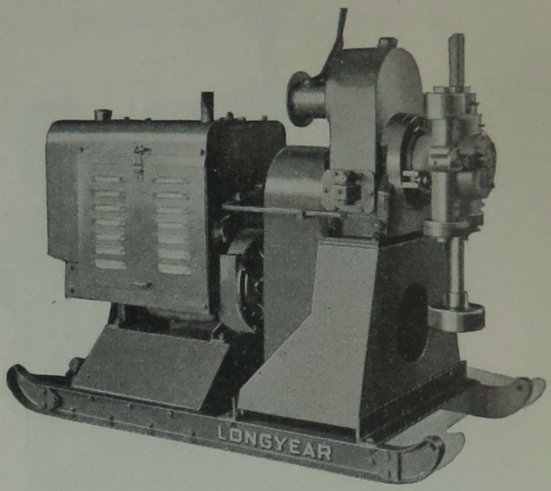
Compactly mounted on a structural steel frame with controls conveniently located. Assembly is entirely enclosed. Pressure greasing throughout.

Rated capacity, 1500 feet of E hole, recovering a $\frac{7}{8}$-inch core or 1250 feet of A hole with $1\frac{1}{8}$-inch core. Larger diameter holes may be drilled with the depth correspondingly reduced.

Powered by a standard make, industrial type gas engine which develops 20 h.p. at 1200 r.p.m. Gas consumption, 8 to 12 gallons per 8-hour shift.

Prices upon application.

Longyear Junior Scout Core Drills



Designed primarily for work involving the sinking of standpipe, and core drilling after ledge is reached. Particularly adaptable for foundation testing and for mineral exploration of moderate depths.

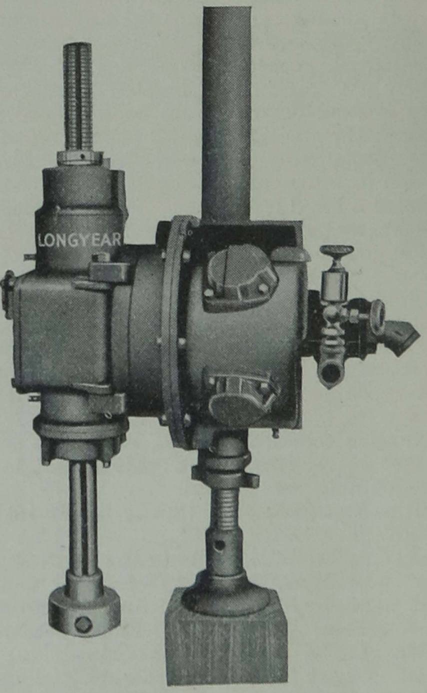
Will handle 3-inch casing through surface overburden to a depth of over 1000 feet and has a rated capacity for core drilling of 500 feet, drilling a $1\frac{1}{2}$-inch hole and recovering EX cover, $\frac{7}{8}$-inch in diameter. Holes of larger diameter may be drilled with a reduction in depth due to added weight of rods.

This drill has been given severe field tests on contract work and has been most satisfactory.

A compact and light drill. Welded steel frame gives great rigidity. Slow speed available for fishtailing and the fast speed for core drilling.

Prices upon application.

Longyear Air Prospector Core Drills



An all-service light diamond core drill for use with compressed air.

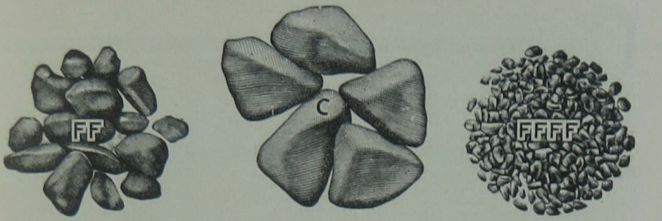
May be equipped with a rod puller attached to swivel head in such a manner that it is always in line with drill hole when hoisting rods.

The rated capacity is 250 feet of EX ($\frac{7}{8}$-inch) core, holes $1\frac{1}{2}$ inches in diameter.

Equipped with 4-cylinder motor, capable of delivering $3\frac{1}{2}$ h.p. running at 1000 r.p.m.

Prices upon application.

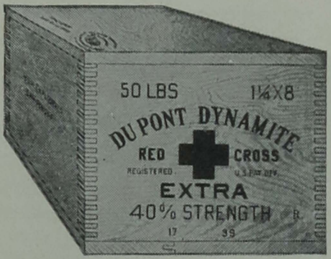
Du Pont Blasting Powders



B blasting powder for use in railroad construction work, stripping operations and coal mining is made in 7 granulations. F, FF, FFF and FFFF are the finer granulations and C, CC and CCC the coarser. The finer the granulation the quicker powder is in action. Large charges of blasting powder are usually fired by a dynamite primer. In coal mines blasting powder is fired by an electric squib, safety fuse or miner's squib. Electric squibs give best execution and least smoke. Packed in 25-pound metal kegs.

Du Pont Red Cross Extra Dynamite

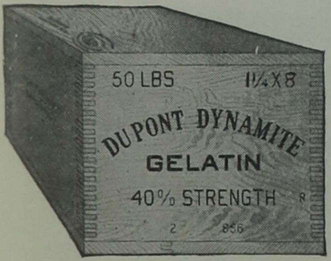
15 to 60 Per Cent



This is a low freezing high explosive of moderate shattering power and fairly good water resistance which is used in a wide variety of blasting operations such as quarrying medium hard stone, excavating for construction work, razing old buildings, blasting boulders, blasting stumps, subsoil blasting, tree planting, and other agricultural work except ditching by the propagation method.

Price.............................per 100 pounds .....

Du Pont Gelatin—20 to 90%



A dense, plastic, highly water-resisting, low freezing explosive which is chiefly used in heavy quarry work, underground ore mining, tunnel driving and submarine blasting. It gives off a minimum of poisonous fumes.

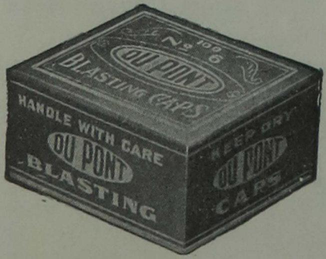
Price.....per 100 lbs. .....

Du Pont Special Gelatin—30 to 90%

An ammonia gelatin which is somewhat cheaper than du Pont Gelatin. It is also low freezing and gives off very little objectionable fumes. It is a little less plastic and a little less water resistant than du Pont Gelatin but is being used with satisfaction in mining, quarrying and tunneling.

Per 100 Pounds.. .....

Du Pont Blasting Caps

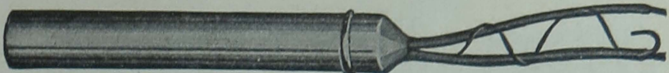


Blasting caps are small copper cylinders closed at one end and charged with an extremely sensitive explosive compound.

They are made in No. 6 and No. 8 sizes. The No. 6 is the standard size for all ordinary work.

Prices upon application.

Du Pont Electric Blasting Caps



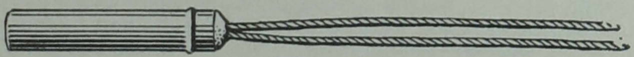
Electric blasting caps with copper wires are made in No. 6 and No. 8 sizes. Stock lengths of wire: 4, 6, 8, 10, 12, 14, 16, 18 and 20 feet.

Caps for coal mining are supplied with iron wires covered with white insulation. If specified on the order, the wires will be short circuited as a safeguard against premature explosion of the cap through accidental contact with stray electric current or a charged surface. Standard lengths of iron wires are 4, 5, 6 and 8 feet. No. 6 is the standard size for iron wire caps. The copper shells of all du Pont electric blasting caps are coated with red shellac.

No		**6**	**8**
Length of Shell	inches	1$\frac{9}{16}$	1$\frac{7}{8}$
Calibre of Shell	inches	.273	.273

Prices upon application.

Du Pont Electric Squibs



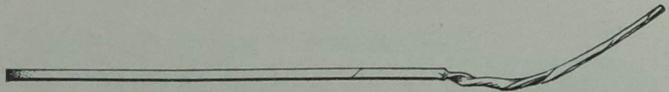
Electric squibs are designed for firing blasting powder and pellet powder. They eliminate the smoke from burning fuse, permit igniting the charge in the center, allow the blaster to control the moment of firing and practically do away with the chances of hang fires.

The improved Du Pont Electric Squib has an aluminum shell with two holes near the base. The flame from the ignition mixture in the Squib shoots out of these holes perpendicular to the axis of the Squib, thus insuring intense local heating at two points. It is designed to give a hot flame of long duration, and so give surer ignition.

Du Pont Electric Squibs are made with 4, 5, 6 and 8-foot iron wires and with copper wires from 4 up to 30 feet long.

Prices upon application.

Du Pont D. & B. Miners' Safety Squibs

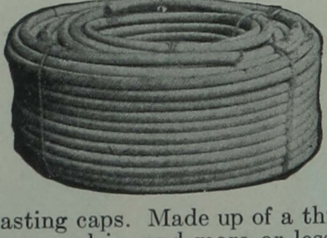


For coal mining use. Burns very slowly and will not blow out easily.

Packed 100 in a pasteboard box, 10 boxes to a case.

Per 100.. **$.30**

Safety Fuse



Used with blasting caps. Made up of a thin train of powder tightly compressed in, and more or less water-proofed by inner and outer wrappings or coverings. Stocked in three popular grades: Sylvanite, for use in damp work; White Monarch, for use in very wet work; Black Monarch, for use in water.

In packages containing from 100 to 6,000 feet. Also on 3,000-foot reels.

Quantity prices prevail in following lots: Up to 6,000 feet, 6,000 to 30,000 feet, 30,000 to 90,000 feet.

Rawhide Blasting Paper

Width of rolls, 9 inches.

Packed 100 rolls to a case.

Weight, per case, 110 pounds.

Price...per pound **$.15**

Du Pont Connecting Wire

This is 20-gauge insulated copper wire used for connecting electric blasting caps when the cap wires are too short to reach between holes. Comes on spools containing either 1 or 2 pounds each or about 210 or 420 feet.

Prices upon application.

Du Pont Leading Wire

DU PONT
LEADING WIRE

Leading wire is insulated copper wire (No. 14 Brown & Sharpe gauge).

The leading wire should always be long enough to keep the blaster well out of the zone of danger.

Duplex leading wire is made by binding together two insulated copper wires with an outside insulation, thus giving a return circuit cable that may be handled the same as a single wire. It weighs approximately twice as much as the same length of single leading wire and can be had in coils of the same lengths. Recommended only for single shot firing.

Single leading wire is furnished in coils as follows:

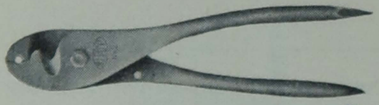
Length.........................feet	**200**	**250**	**300**	**500**
Approximate Weight.........pounds	4	5	5.8	9.6

Prices upon application.

No. 1 Du Pont Cap Crimpers

5½ inches long, made of steel, nickel-plated, with 1 handle pointed for use as a punch in priming dynamite cartridges.

Makes a flat sleeve crimp.

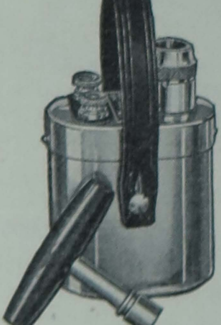


No. 2 Du Pont Cap Crimpers and Fuse Cutters

Makes a flat sleeve crimp. Designed to vent cap to prevent gas pressure from blowing spit back into fuse. Made of steel, nickel plated, 6½ inches long. Has crimping jaws and fuse cutting device for cutting straight across. One handle is pointed, the other has a screwdriver point.

Prices upon application.

Du Pont Blasting Machines



No. 1

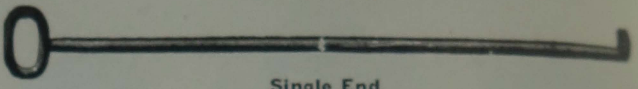
No. 30

The No. 100, with a capacity of 100 electric blasting caps, weighs 36 pounds and has the greatest range of use.

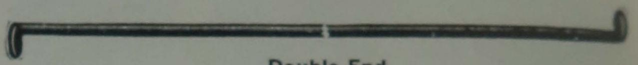
Other sizes are the Nos. 50, 30, 20, 10, all push down and two twist machines, the No. 10 Twist and the No. 1 Permissible.

Prices upon application.

Alton Scrapers



Single End



Double End

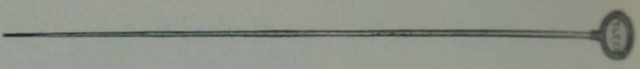
These scrapers are made either single or double end as shown of either ⅜-inch or 7/16-inch round iron. Lengths, 5 to 8 feet.

Furnished with either iron or copper button. Scrapers with copper button are made in compliance with legal requirements.

Funnel scrapers with copper button furnished if desired.

Prices upon application.

No. 175 Leetonia Copper Needles



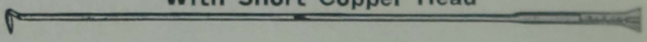
Drawn from ⅜-inch hard copper rods to an exact taper, ground, highly polished and lacquered to prevent corrosion.

The handle is large enough to allow a full grip of the hand and is made of the best malleable iron. Copper rod is fastened in handle with a small rivet which prevents it from getting loose. Specify length when ordering.

No.	Lgth. Ft.	Price per Doz.	No.	Lgth. Ft.	Price per Doz.	No.	Lgth. Ft.	Price per Doz.
175	4½ or 5	**$40.00**	**175**	5½ or 6	**$42.00**	**175**	6½ or 7	**$45.00**

No. 178 Leetonia Copper Head Tampers and Scrapers

With Short Copper Head



The scraper end is so made that it will not push the drillings to the back of the hole. The body is made of ½-inch soft steel and painted black. When ordering, kindly give extreme length of tamper and scraper, diameter of copper head and diameter of steel stub.

Diam. Copper Head In.	*Size Round Steel Stub	Price, per Dozen		
		5-foot and Under	5½ and 6-foot	6½ and 7-foot
1¼	¾	**$32.00**	**$34.00**	**$36.00**
1½	¾	**34.00**	**36.00**	**38.00**
1½	⅞	**36.00**	**38.00**	**40.00**
1¾	⅞	**38.00**	**40.00**	**42.00**
2	1	**40.00**	**42.00**	**44.00**

*Stub to which ½-inch steel is welded.

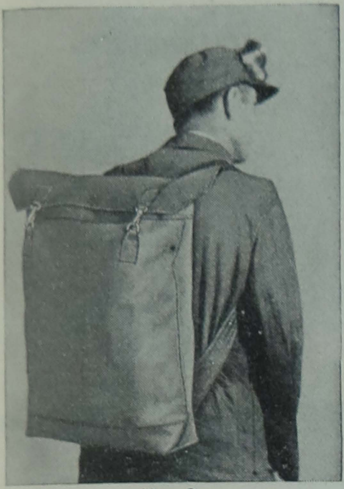
No. 177 Copper Head Tamp Drills

With Short Copper Head

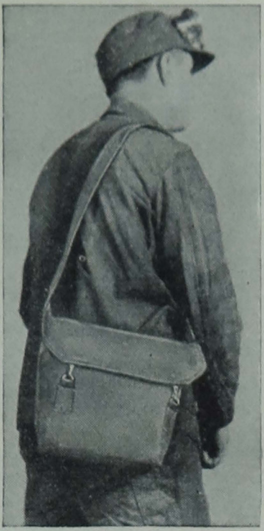
This tamp drill has a soft steel body, tool steel bit; nicely painted. When ordering, kindly give extreme length of drill, diameter of copper head and diameter of steel body. Can be furnished with pipe body at an additional cost.

Diam., In.		Price, per Dozen		
Copper Head	Round Steel Body	5-foot and Under	5½ and 6-foot	6½ and 7-foot
1¼	¾	**$39.00**	**$41.00**	**$43.00**
1½	¾	**41.00**	**43.00**	**45.00**
1½	⅞	**43.60**	**45.00**	**47.40**
1¾	⅞	**44.60**	**47.00**	**49.40**
2	1	**48.40**	**51.00**	**53.60**

Du Pont Powder Bags



No. 2
Knapsack



No. 4
Pouch

For carrying high explosives.

Resists fungus, dry rot, acid waters, wet, humid conditions and other destructive elements found underground. Made of cloth which has been treated and coated with a special rubber compound that makes it waterproof and a non-conductor of electricity. A special thread used in sewing, which is also treated to resist underground mining conditions.

No. 1 Pouch Type

Capacity, 50 sticks. Single bottom, single 3-ply strap sewed to each side. Size, 6x10x12 inches.

No. 1..each **$1.25**

No. 2 Knapsack Type

Capacity, 100 sticks. Double box bottom, reinforced top, two 3-ply straps crossed in back. Size, 4½x12x20 inches.

No. 2..each **$2.50**

No. 3 Knapsack Type

Capacity, 125 sticks. Single box bottom, two 3-ply straps crossed in the back. Size, 6x12x20 inches.

No 3..each **$2.40**

No. 4 Pouch Type

Designed especially for carrying du Pont pellet powder. Capacity, 26 sticks 1¼ inches in diameter, 20 sticks 1⅜ inches in diameter, 17 sticks 1½ inches in diameter, 9 sticks 2 inches in diameter, and 6 sticks 2½ inches in diameter. Size, 3x8½x9½ inches.

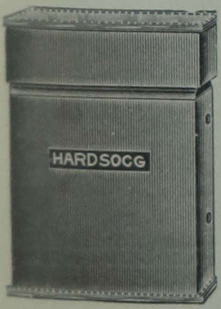
No. 4..each **$1.00**

No. 5 Pouch Type

Designed especially for carrying du Pont pellet powder. Capacity about two-thirds that of No. 4 bag.

No. 5..each **$.50**

Hardsocg Powder or Dynamite Boxes



Made of heavy waterproof fibre, securely sewed with heavy thread. No rivets.

Packed in individual paper cartons. Weight, about 1 pound each.

Regular Size

Height, 9 inches. Width, 6 inches. Thickness, 3 inches.

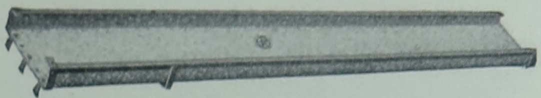
Each........................ **$1.25**

Large Size

Height, 9 inches. Width, 8½ inches. Thickness, 4¼ inches.

Each........................ **$1.50**

Red Star Chutes for Coal, Sand Grain and Concrete



This Red Star Chute is made of best grade carbon steel sheets, heavily reinforced by angle along the sides. Both ends are reinforced by a flat steel band.

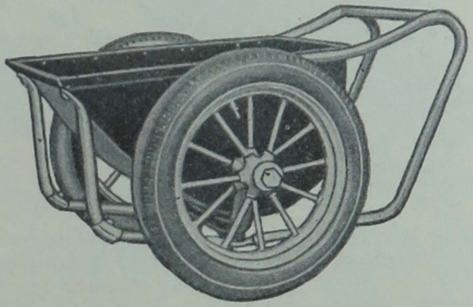
All chutes telescope, that is—the small end of any chute fits into the large end of any chute.

Made in black or galvanized in following.

Length Feet	Each Black	Each Galv.	Weight Pounds	Length Feet	Each Black	Each Galv.	Weight Pounds
6	$10.00	$10.60	47	12	$13.50	$14.70	98
8	11.50	12.30	67	14	16.00	17.40	105
10	12.50	13.50	83	..	.....	.....	...

Series R-30 Red Star Concrete Carts

Pneumatic Tired Wheels



Front legs provide forward dump like end dump barrow; with artillery axle legs—both front and rear; 30-inch pneumatic tire wheel.

No. 630—6-Cubic Foot Capacity

Length, 57½ inches; width, 39 inches; height, 32 inches; tread 36 inches.

No. **630**, Complete with Drop Center Rim Wheel, Timken Bearings; 21x3.25 Drop Center Rim Wheel for 4.40x21 Straight Side Tire; 1⅜-In. Precision Axle Drawing H-1414.

Without Tires and Tubes	each	**$64.00**
Hopper	each	**36.00**
Wheels	each	**14.00**
Extra for Two 4 Ply 4.40x21 or 4 Ply 4.50x21 Straight Side Tires and Inner Tubes		**22.00**
Complete with Tires and Tubes		**86.00**

Weight

Hopper Complete	pounds	134
Wheels with Tires and Tubes	pounds	50
Wheels less Tires and Tubes	pounds	30
Cart Complete less Tires	pounds	194
Cart Complete with Tires	pounds	234

No. 930—9-Cubic Foot Capacity

Length, 57½ inches; width, 45 inches; height, 32 inches; tread 42 inches.

No. **930**, Complete without Tires	each	**$72.00**
Hopper	each	**44.00**
Wheels	each	**14.00**
Extra for Two 4 Ply 4.40x21 or 4 Ply 4.50x21 Straight Side Tires and Inner Tubes	each	**22.00**
Complete with Tires and Tubes		**94.00**

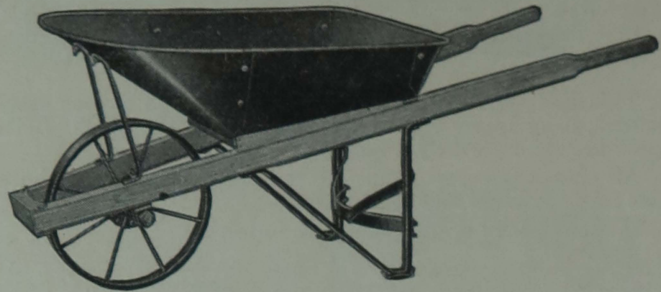
Weight

Hopper Complete	pounds	147
Wheels with Tires and Tubes	pounds	50
Wheels less Tires and Tubes	pounds	30
Cart Complete less Tires	pounds	207
Cart Complete with Tires	pounds	247

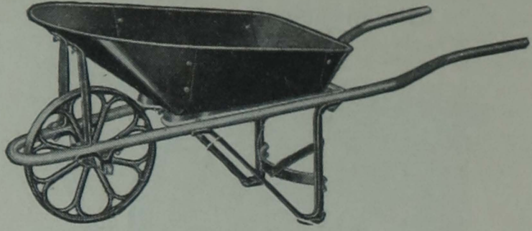
Steel Tray Wheelbarrows

Standard Cleveland

Channel Steel Wheel



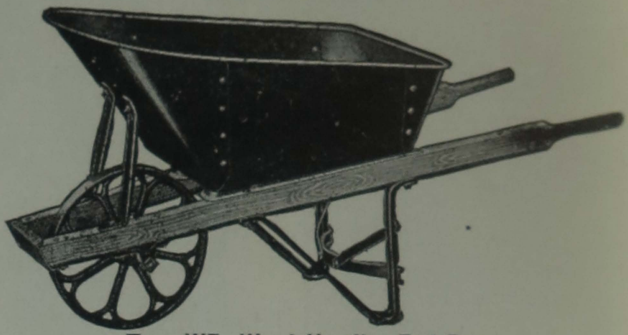
No. 4216CW—Wood Handle



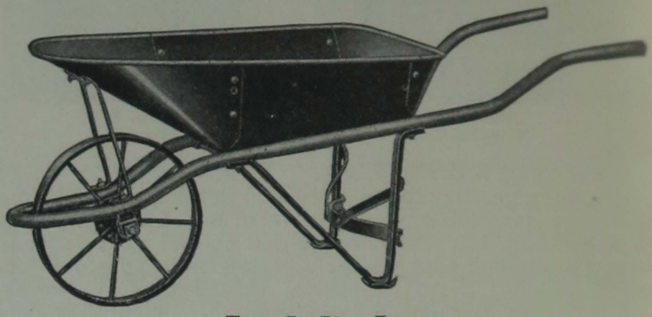
No. 4216—Pipe Handle

Red Star

Malleable Iron Wheel



Type WE—Wood Handle—End Dump



Type P—Pipe Frame

Distinctive features: Double bottom tray; 85% of load on wheel; curved leg brace; easy and clean dumping; complete interchangeability of parts.

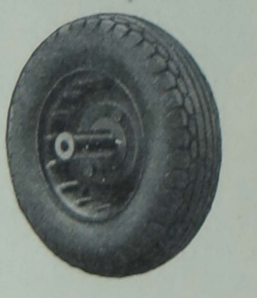
First figure of tray number denotes cubic feet capacity; next 2 figures denote gage; letter M denotes measuring. Example: 216M—2 cubic feet; No. 16 gage; M, measuring.

	Standard Cleveland				Red Star					Tray Dimensions					
	CW Barrow		CP Barrow		WE Barrow		P Barrow								
Barrow No.	Each	Wt. Lbs.	Each	Wt. Lbs.	Each	Wt. Lbs.	Each	Wt. Lbs.	Tray Each	Length of Top In.	Width of Top In.	Depth of Front In.	Depth of Rear In.	Height In.	Heaped Cap. Cu. Ft
216M	$8.20	60	$8.70	65	$11.50	71½	$12.00	77½	$3.20	33	22¾	9	7	11	2
2516M	8.30	62	8.80	67	11.60	73½	12.10	79½	3.30	35	23½	10½	8¼	12	2½
312	8.80	73½	9.30	78½	12.10	85	12.60	91	3.80	35	24	8	4½	10½	3
316	8.00	58½	8.50	63½	11.30	70	11.80	76	3.00	35	24	8	4½	10½	3
316M	8.60	65½	9.10	70½	11.90	77	12.40	83	3.60	35	24½	12	10	13½	3
412	10.50	78½	11.00	83½	13.80	90	14.30	96	5.50	36½	27	9	5½	11½	4
416	8.20	61½	8.70	66½	11.50	73	12.00	79	3.20	36½	27	9	5½	11½	4
*4216	8.60	66	9.10	71	11.90	77½	12.40	77½	3.60	37½	27	12	8½	15	4½
4516	9.00	70	9.50	75	12.30	81½	12.80	87½	4.00	39	28	11½	8	16½	4½
516	9.20	69½	9.70	74½	12.50	81	13.00	87	4.20	38½	24	13	9	16	5
616	11.00	70½	11.50	75½	14.30	82	14.80	88	6.00	43	32	10½	5½	13½	...
716	12.00	85	12.50	90	15.30	96½	15.80	102½	7.00	48	22	13½	9	18	...
816	12.00	76	12.50	81	15.30	87½	15.80	93½	7.00	46	35	11½	7½	16	...
1116	14.00	85	14.50	90	17.30	96½	17.80	102½	9.00	48	39	15	11	18½	...
1200	12.00	97	12.50	102	15.30	108½	15.80	114½	7.00	28	24	16	....	16	...
1230	9.40	66	9.90	71	12.70	77½	13.20	83½	4.40	28	24	†	†	16	...

*This barrow is recommended for concrete work. †Gage of tray, 1 inch.

Parts

CW Frame, Wt., 19 Lbs. ....each	$2.25	Front Bottom Brace.ea.	$.30	WE Frame, Wt., 25 Lbs.....each	$4.00	Front Bottom Brace.ea.	$.30
CP Frame, Wt., 24 Lbs. ....each	2.75	Rear Bottom Brace..ea.	.30	P Frame, Wt., 31 Lbs.ea	4.50	Rear Bottom Brace..ea.	.30
Assem. Legs, Wt., 7 Lbs.....each	1.00	CW Handles.....ea.	.90	Wheel, Wt., 15 Lbs. ....each	3.00	WE Handles.....ea.	1.00
Wheel, Wt., 11½ Lbs. ....each	1.75	CP Handles.....ea.	2.40	Assem. Legs, Wt., 9 Lbs.....each	1.30	Pipe Handles.....ea.	2.50
Wheel Guard.....each	.30	CW Bearings.....ea.	.30	Tray Bottom.....each	1.50	WE Bearings.....ea.	.30
		CP Bearings.....ea.	.30	Wheel Guard.....each	.30	Pipe Bearings.....ea.	.30
		Axle.....ea.	.30			Axle.....ea.	.30
		Nose Brace.....ea.	.30			Nose Brace.....ea.	.30
		Leg Shoes.....ea.	.10			Leg Shoes.....ea.	.10



Pneumatic Tire Disc Wheels

With Single Tube Tire—No Inner Tube

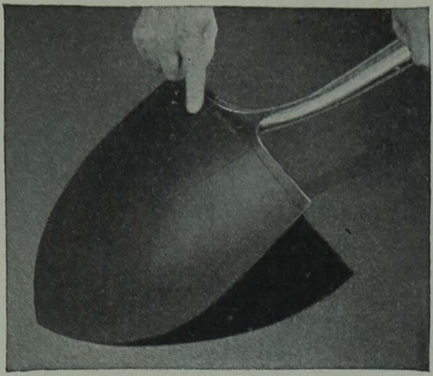
	Plain Bearing		*Roller Bearing		Ball Bearing	
Size Tire	No.	Each	No.	Each	No.	Each
16x4—2 Ply	ST-1	$9.40	ST-2	$10.70	ST-3	$9.80
16x4—4 Ply	ST-4	10.30	ST-5	11.60	ST-6	10.70

With Double Tube Tire—with Inner Tube

16x4—2 Ply	DT-1	$10.30	DT-2	$11.60	DT-3	$10.70
16x4—4 Ply	DT-4	11.20	DT-5	12.50	DT-6	11.60

*We stock and recommend single tube roller bearing wheels. When balloon tired wheels are furnished, the price of steel wheels are deducted.

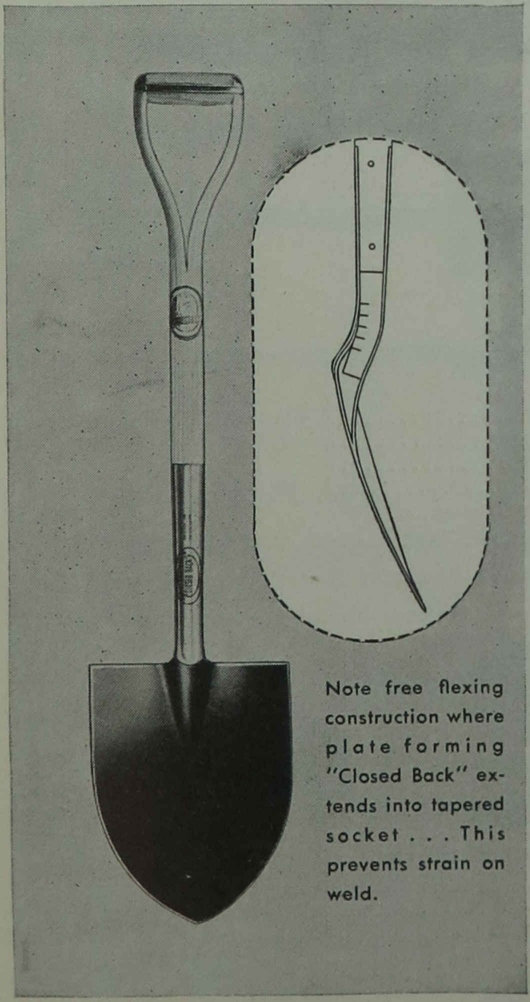
Wood's Closed Back Shovels



The closed back feature makes available a shovel that combines the good features of the welded strap, the hollow back and the solid shank shovels, and overcomes the disadvantages of each.

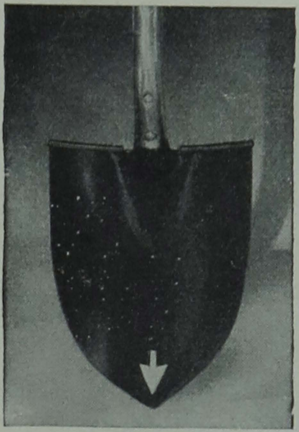
Wood's Closed Back Shovel has a smooth blade, front and back—a resilient shank that is heat-treated. It has the lift or bend of a plain back shovel and the lightness of a hollow back shovel without the open space to which some workmen object. Handles are straight and easily replaced.

The manufacturer believes this shovel to be stronger in the shank than any other shovel, and invites its users to submit it to actual test in use on the toughest jobs. Workmen will like its trim, tapered socket and perfect balance.



Note free flexing construction where plate forming "Closed Back" extends into tapered socket . . . This prevents strain on weld.

Wood's Arrow Point Shovels



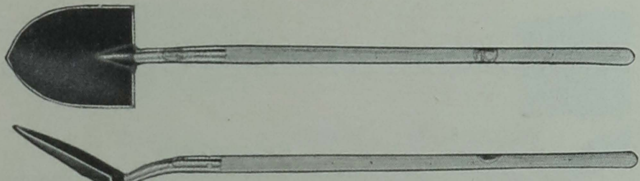
The Arrow Point is an improvement on the regular Round Point shovel construction. The point enters the material like the bow of a boat in water and throws back the material more on the sides so that the greater wear takes place there and the shovel retains its sharp point and original shape.

This feature also makes shovelling easier as there is not so much resistance.

Any round point shovel in size 2 can be furnished in the arrow point design at no extra charge.

No. 5W2CB Wood's Molybdenum Long Handle Shovels

Round Point—Closed Back



Blade is No. 14 gage molybdenum steel. Handle is straight grain, second growth, northern white ash with medium size knob top. With step.

Size blade, 9x11¾ inches. Length handle, 4½ feet.

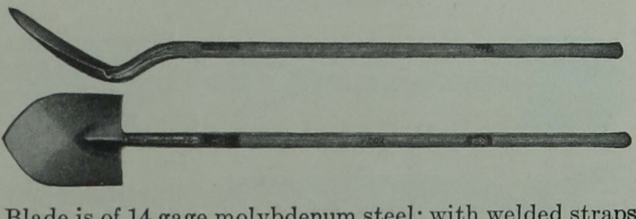
Black finish with polished socket.

Weight per dozen, 65 pounds.

No. 5W2CB, Size No. 2.................per dozen **$27.00**

No. 5W2X Wood's Molybdenum Long Handle No Step Mining Bend Shovels

Round Point—Plain Back



Blade is of 14 gage molybdenum steel; with welded straps. Handle is straight grain, second growth northern white ash. Size blade, 9½x11¾ inches. Length handle, standard 4½ feet, or special 42 inch mucking handle.

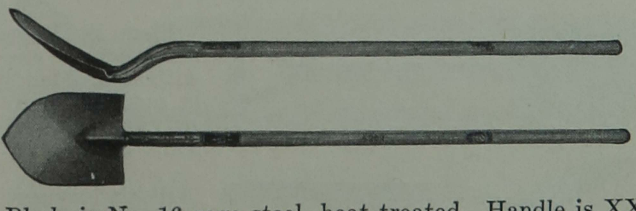
Black blade with polished straps.

Weight per dozen 65 pounds.

No. 5W2X, Size No. 2...................per dozen **$27.00**

No. 204W Wood's Molybdenum Long Handle Half Spring Mining Bend Shovels

Round Point—Pacific Coast Pattern—Plain Back



Blade is No. 16 gage steel, heat treated. Handle is XX grade, sanded and waxed. With step.

Size blade, 9½x12 inches. Length handle, 50 inches from shoulder of blade to end of handle.

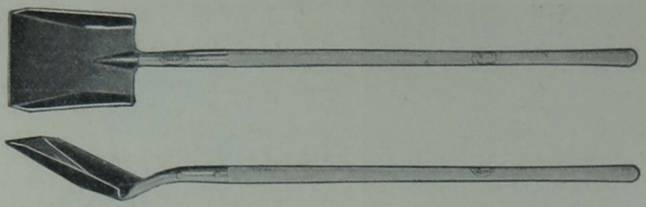
Weight per dozen, 56 to 58 pounds.

Black blade with polished straps.

No. 204W, Size No. 2....................per dozen **$28.00**

Wood's Molybdenum Long Handle Shovels

Square Point—Closed Back



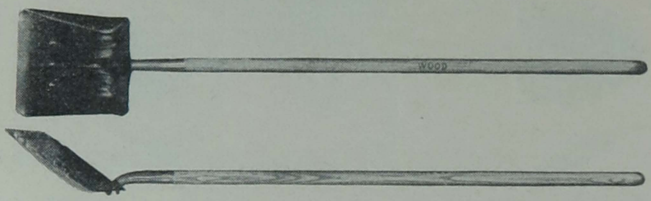
Blade is 14 gage molybdenum steel. Black blade with polished socket. With step.

Length handle 4½ feet; second growth northern white ash.

No.	4W2CB	4W3CB	4W4CB	4W6CB
Per Dozen	**$27.00**	**28.00**	**29.00**	**31.00**
Size No.	2	3	4	6
Blade.......in.	9½x11¾	9¾x12¼	10½x12½	11¼x13½
Wt. per Doz. lbs.	66	68	70	74

No. LW172 Wood's Molybdenum Long Handle Snow and Street Cleaning Shovels

Square Point—Hollow Back



Blade is 16 gage molybdenum steel, corrugated. Handle is long type.

Size blade, 14x14½ inches.

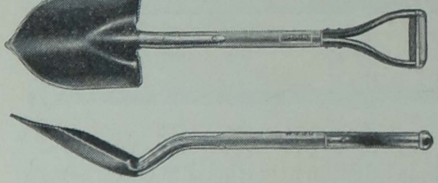
Black blade with polished socket.

Weight per dozen, 62 pounds.

No. LW172, Size No. 2..................per dozen **$29.50**

Wood's Molybdenum Moly-D Handle Shovels

Round Point—Closed Back



Blade is 14 gage molybdenum steel.

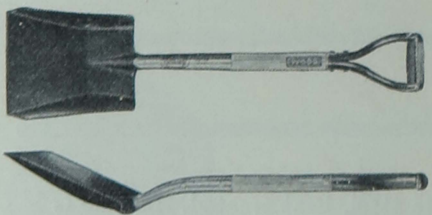
Handle is second growth northern white ash. With step.

Black blade with polished socket.

No.	V3W2CB	V3W3CB	V3W4CB	V3W6CB
Per Dozen	**$27.00**	**28.00**	**29.00**	**31.00**
Size No.	2	3	4	6
Blade........in.	9¼x11¾	9½x12¼	9¾x12¾	10¼x13¾
Wt. per Doz. lbs.	58	60	62	66

Wood's Molybdenum Moly-D Handle Shovels

Square Point—Closed Back



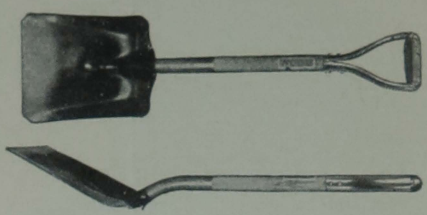
Blade is 14 gage molybdenum steel with step. Handle is second growth, northern white ash.

Black finish with polished sockets.

No.	V2W2CB	V2W3CB	V2W4CB	V2W6CB
Per Dozen	**$27.00**	**28.00**	**29.00**	**31.00**
Size No.	2	3	4	6
Blade.......in.	9½x11¾	9¾x12¼	10½x12½	11¼x13½
Wt. per Doz. lbs.	60	62	64	68

Wood's Molybdenum Concrete or Ore Shovels

Square Point — Hollow Back



Has a flat bottom and a straight edge with sides tapering about 2 inches from the edge.

Handle is 25 inches long.

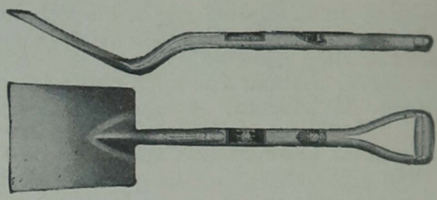
Has a 15-gauge blade, black with polished socket.

No.	Size No.	Blade Inches	Wt., Lbs. per Dozen	Price per Dozen
VOW2	2	10 x12	57	**$29.00**
VOW3	3	10½x12½	59	**30.00**
VOW4	4	11 x13	61	**31.00**
VOW6	6	12 x14	65	**33.00**

Wood's Molybdenum Moulders' Shovels

Full Polished Blades and Straps

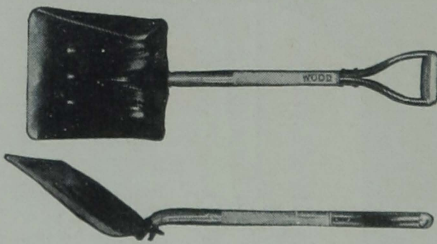
Plain Back, Welded Strap



Size No.	Dimensions Blade Inches	List No. Old Style D Handle	List No. Split Moly-D Handle	Per Doz.	Approx. Weight Pounds per Doz.
2	10x11¾	**W90**	**VW90**	**$28.00**	50

Wood's Molybdenum 3-Prong Type Moly-D Handle Coal Scoops

Square Point—Hollow Back



This scoop is a 3-prong Gold Bug pattern scoop.

Blade is 16 gage steel, corrugated.

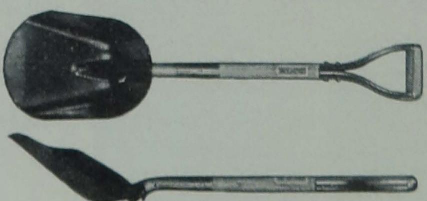
Handle is Moly-D type.

Black blade with polished socket.

No.	VW171TC	VW172TC	VW173TC
Per Dozen	**$29.00**	**29.50**	**30.00**
Size No.	1	2	3
Blade.......in.	13½x14	14x14½	14½x15
Wt., Per Dozen.....lbs.	60	62	64

Wood's Molybdenum Moly-D Handle Narrow Mouth Sand and Gravel Scoops

Hollow Back—Eastern Pattern



With rounded corners.

Blade is 16 gage molybdenum steel.

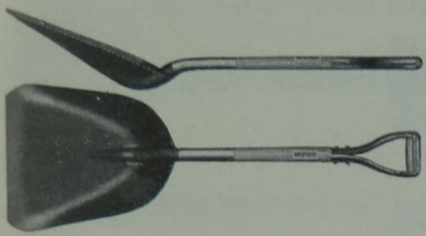
Handle is straight grain, second growth northern white ash.

Black blade with polished socket.

No.	VW83R	VW84R	VW85R
Per Dozen	**$30.50**	**31.00**	**31.50**
Size No.	3	4	5
Blade.......in.	11¼x15	11½x15½	13¾x16
Wt. per Doz.......lbs.	62	64	67

Wood's Molybdenum Moly-D Handle Narrow Mouth Scoops

Hollow Back—Eastern Pattern



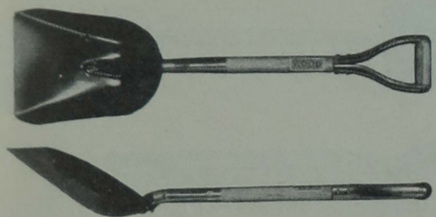
With flat edge. Blade is 15 gage molybdenum steel.

Black finish blade with polished socket.

No.	VW82C	VW83C	VW84C
Per Dozen	**$30.00**	**30.50**	**31.00**
Size No.	2	3	4
Size Blade ...inches	12x15	12½x15½	13x16
Weight per Dozen ...pounds	68	71	74

Wood's Molybdenum Moly-D Handle Narrow Mouth Scoops

Hollow Back



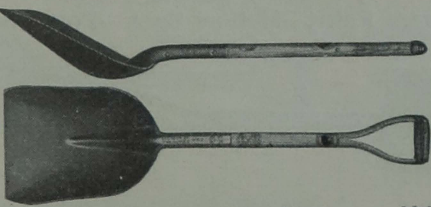
Blade is 16 gage molybdenum steel.

Black finish blade with polished socket.

No.	**VW82**	**VW83**	**VW84**
Per Dozen	**$30.00**	**30.50**	**31.00**
Size No.	2	3	4
Size Blade ...inches	11¼x15	11½x15½	12x15¾
Weight per Dozen ...pounds	62	64	66

Wood's Molybdenum Eastern Pattern Scoops

Narrow Mouth, Hollow Back



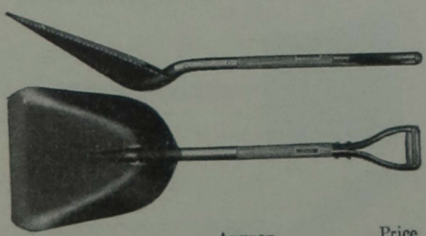
Size No.	Per Dozen	Size Blade Inches	Long Handle No.	Moly-D Handle No.	Approx. Wt., Lbs. per Doz.
1	**$29.50**	11 x14½	**LW81**	**VW81**	60
2	**30.00**	11¼x15	**LW82**	**VW82**	62
3	**30.50**	11½x15½	**LW83**	**VW83**	64
4	**31.00**	12 x15¾	**LW84**	**VW84**	66
5	**31.50**	12¼x16¼	**LW85**	**VW85**	69
6	**32.00**	12½x16¾	**LW86**	**VW86**	72
7	**32.50**	12¾x17	**LW87**	**VW87**	75

Wood's Molybdenum Coal Yard Pattern Scoops

Moly—D Handle, Hollow Back

Has wide mouth with flat edge, flaring sides and 15-gauge blade.

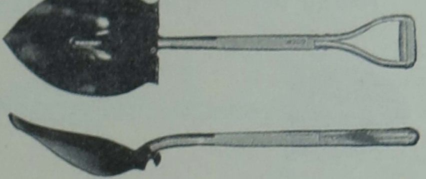
Moly—D handle and black blade with polished socket.



Size No.	Dimensions Blade Inches	List No.	Approx. Wt., Lbs. per Dozen	Price per Dozen
6	14 x16¼	VW136Z	75	**$33.00**
8	14½x17¼	VW138Z	81	**34.00**
10	15 x18¼	VW140Z	87	**36.00**
12	15½x19¼	VW142Z	93	**38.00**

Wood's Molybdenum Breaking Down Scoops

Diamond Point
Hollow Back
Moly-D Handle

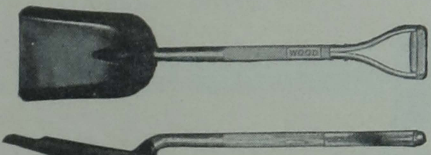


Has 15-gauge blade, black, with polished socket.

Size No.	Blade Inches	Weight Pounds per Doz.	List No.	Price per Dozen
4	11½x15	62	VW134D	**31.00**
5	11¾x15½	64	VW135D	**31.50**
6	12 x16	66	VW136D	**32.00**
8	12½x17	70	VW138D	**33.00**
10	13 x18	74	VW140D	**34.00**
12	13½x19	78	VW142D	**35.00**

Wood's Molybdenum Furnace Scoops

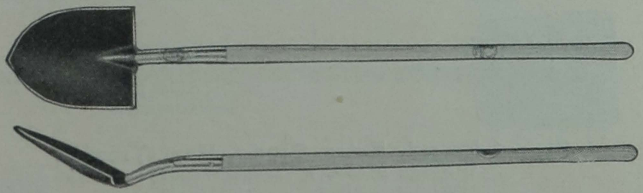
Hollow Back



Size No.	Dimensions Blade Inches	List No. Wood-D Handle	List No. Moly-D Handle	Approximate Weight Pounds per Dozen	Price per Dozen
2	9½x14	**W500**	**VW500**	57	**$30.00**
3	10 x14½	**W501**	**VW501**	59	**30.50**

Wood's Long Handle Contractors' or Road Builders' Shovels

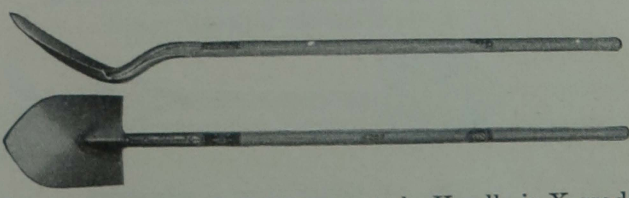
Round Point, Closed Back, Turned Shoulders, 15-Gauge Black Blades and Polished Sockets
Piqua Brand



No.	Per Dozen	Size No.	Size Blade Inches	Weight Pounds per Dozen
5C2CB	**$17.50**	2	9 x11¾	52 to 54
5C3CB	**18.30**	3	9¼x12¼	54 to 56
5C4CB	**19.10**	4	9¾x12¾	56 to 58

No. 204B Wood's Stuart Brand Long Handle Half Spring Mining Shovels

Round Point—Pacific Coast Pattern—Plain Back
Grade B



Made of 16 gage steel, heat treated. Handle is X grade, sanded and waxed.

Size blade, 9½x12 inches. Length handle, 50 inches from shoulder of blade to end of handle.

Black blade with polished straps.

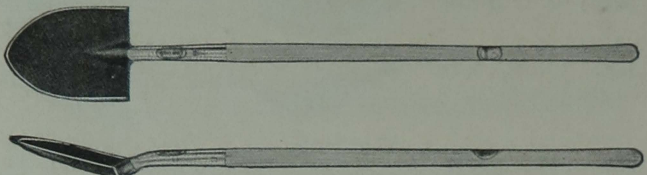
Weight per dozen, 56 to 58 pounds.

No. **204B**, Size No. **2** ....per dozen **$20.00**

No. C2CB Wood's Piqua Brand Long Handle Irrigating Shovels

Round Point—Turned Shoulders—Closed Back

Grade C



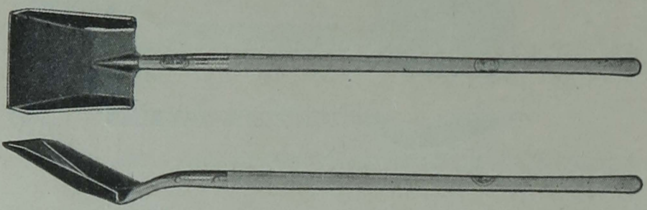
Blade is 15 gage steel. Handle is No. 1 grade, sanded and waxed.

Size blade, 8½x11¾ inches. Length handle, 47 inches from shoulder blade to end of handle. Satin finished blade and polished socket. Weight per dozen, 51 to 52 pounds.

No. C2CB, Size No. 2....................per dozen **$17.50**

Wood's Long Handle General Service Shovels

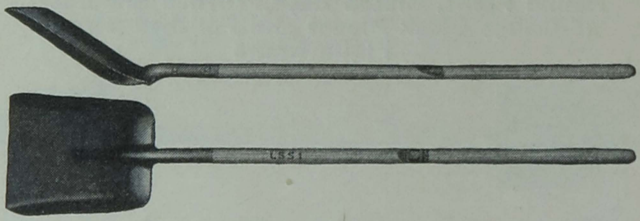
Square Point, Closed Back, Turned Shoulders, 15-Gage Black Blades and Polished Sockets
Piqua Brand—Grade C



No.	Per Dozen	Size No.	Size Blade Inches	Weight Pounds per Dozen
4C2CB	**$17.50**	2	9½x11¾	56 to 58
4C3CB	**18.30**	3	10 x12¼	58 to 60
4C4CB	**19.10**	4	10¼x12¾	60 to 62

Wood's Snow or Barn Shovels

Long Handle, Narrow Socket, Hollow Back
Black Blade and Polished Socket

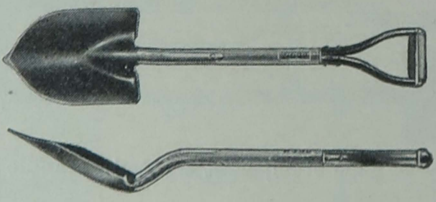


Stuart Brand, Extra Grade, Heat-Treated
16-Gage Blade, X Grade Handle

No.	Per Dozen	Size No.	Size Blade Inches	Wt.,Lbs. per Dozen
LSS1	**$18.00**	2	11¼x14¼	58 to 60
With Flat Side Handles to Prevent Turning				
FLSS1	**$18.00**	2	11¼x14¼	58 to 60
With Split D Handles				
VSS1	**$18.00**	2	11¼x14¼	58 to 60

Wood's D Handle Contractors' or Digging Shovels

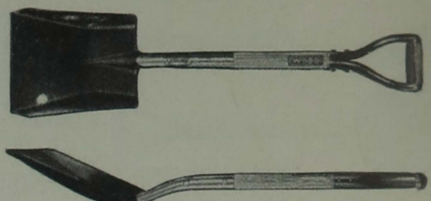
Round Point, Closed Back, Turned Shoulders, 15-Gage Black Blades and Polished Sockets
Piqua Brand—Grade C



No.	Per Dozen	Size No.	Size Blade Inches	Weight Pounds per Dozen
3C2CB	**$17.50**	2	9 x11¾	50 to 52
3C3CB	**18.30**	3	9¼x12¼	52 to 54
3C4CB	**19.10**	4	9¾x12¾	54 to 56

Wood's D Handle Dirt, Railroad or General Service Shovels

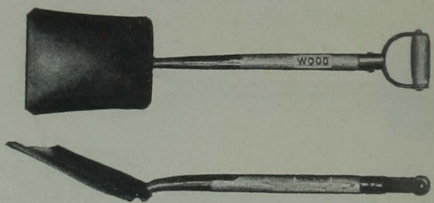
Square Point, Closed Back, Turned Shoulders, 15-Gage Black Blades and Polished Sockets
Piqua Brand—Grade C



No.	Per Dozen	Size No.	Size Blade Inches	Weight Pounds per Dozen
2C2CB	**$17.50**	2	9½x11¾	53 to 55
2C3CB	**18.30**	3	10 x12¼	55 to 57
2C4CB	**19.10**	4	10¼x12¾	57 to 59

No. 2M2H Wood's D Handle Malleable Grip Railroad Tamping Shovels

Square Point—Solid Shank



Has flat edge for tamping. Blade is 14 gage steel. Handle is XX grade, sanded and waxed.

Size blade, 9¾x12 inches. Length handle, 26½ inches from shoulder of blade to end of handle.

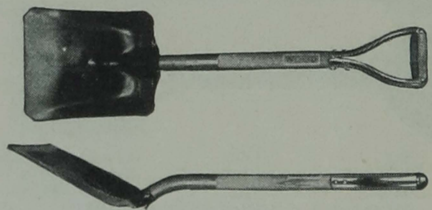
Black blade and polished sockets.

Weight per dozen, 65 to 67 pounds.

No. 2M2H, Size No. 2....................per dozen **$22.00**

Wood's Stuart Brand D Handle Ore Shovels

Square Point—Hollow Back—Flat Blade
Grade B



Blade is 14 gage steel.

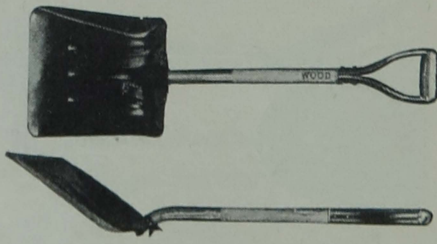
Handle is X grade, sanded and waxed; Moly D grip. Standard length handle, 25 inches from blade shoulder to top of handle.

Black blade and polished socket.

No.	0B4	0B6
Per Dozen	**$19.60**	**21.20**
Size No	4	6
Size Blade, in.	11x13	12x14
Wt. per Doz, lbs.	62–64	66–68

Wood's Piqua Brand 3-Prong Type Moly-D Handle Coal Shovels

Hollow Back



This shovel is the 3-prong Gold Bug pattern.

Blade is 17 gage steel.

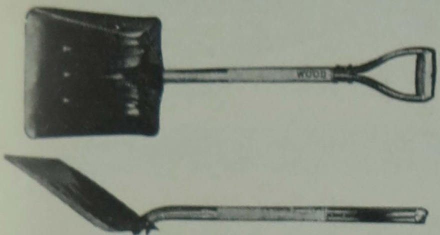
Handle is No. 1 grade, sanded and waxed.

Black finish.

No.	C171TC	C172TC	C173TC
Per Dozen	**$17.50**	**18.30**	**19.10**
Size No	1	2	3
Size Blade, in.	13¼x14	13¾x14½	14¼x15
Wt., Per Dozen, lbs.	62–64	64–66	66–68

Wood's Big Fist Brand 3-Prong Type Moly-D Handle Coal Shovels

Hollow Back



This shovel is the 3-prong Gold Bug pattern.

Blade is 17 gage steel.

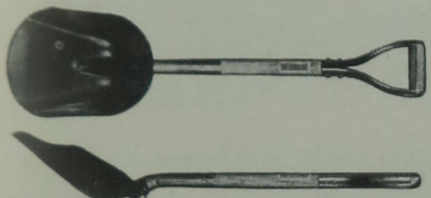
Handle is No. 1 grade, sanded and waxed.

Black finish.

No.	BF171TC	BF172TC	BF173TC
Per Dozen	**$28.00**	**28.80**	**29.60**
Size No.	1	2	3
Size Blade, in.	13¼x14	13¾x14½	14¼x15
Wt., Per Dozen, lbs.	62–64	64–66	66–68

Wood's Piqua Brand Moly D-Grip Sand or Gravel Scoops

Eastern Pattern—Hollow Back
Grade C



Blade is 16 gage steel. Handle is X grade, sanded and waxed.

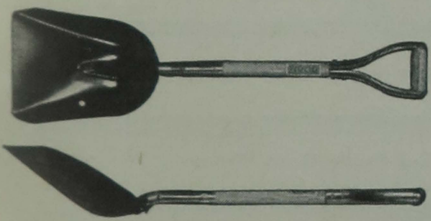
Length handle, 26½ inches from shoulder of blade to end of handle.

Black bowl; polished socket.

No.	C82RP	C83RP	C84RP
Size No.	2	3	4
Per Dozen	**$17.00**	**17.80**	**18.60**
Size Blade, inches	11x15	11¼x15½	11½x15¾
Weight per Dozen, pounds	56–58	58–60	60–62

Wood's Eastern Pattern Scoops

Piqua Brand, Grade C



D Handle
Narrow Mouth
Hollow Back

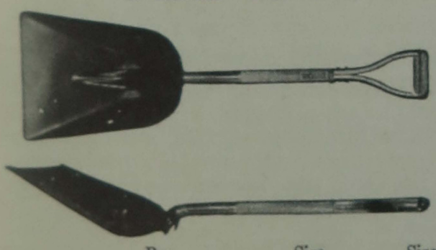
Black Bowl
Polished Socket

Has 16-gauge blade; No. 1 grade handle, sanded and waxed.

No.	Per Dozen	Size No.	Size Blade Inches	Wt. Lbs. per Dozen
C82	**$17.00**	2	11¼x15	63 to 65
C83	**17.80**	3	11½x15½	65 to 67
C84	**18.60**	4	11¾x15¾	67 to 69
C85	**19.40**	5	12 x16	69 to 71
C86	**20.20**	6	12¼x16½	71 to 73
C87	**21.00**	7	12¾x17	73 to 75

Wood's Western Pattern Scoops

Piqua Brand, Grade C
D Handle—Wide Mouth—Hollow Back



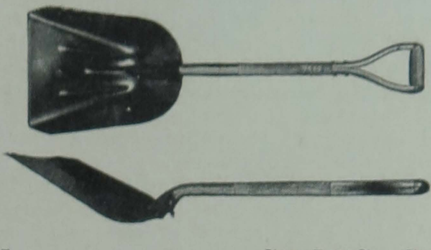
Black Bowl
Polished Socket

Has 16-gauge blade; No. 1 grade handle, sanded and waxed; length of handle, 26½ inches from shoulder of blade to end of handle.

No.	Per Dozen	Size No.	Size Blade Inches	Wt., Lbs. per Dozen
C136	**$20.20**	6	13½x16	68 to 70
C138	**21.00**	8	14 x17	71 to 73
C140	**21.80**	10	14½x18	74 to 76
C142	**22.60**	12	15 x19	78 to 80
C144	**23.40**	14	15½x20	82 to 84

Wood's Light Weight Grain Scoops

Piqua Brand, Grade C
D Handle—Western Pattern—Wide Mouth—Hollow Back



Black Bowl
Polished Socket

Has 17-gauge corrugated blade; No. 1 grade handle, sanded and waxed. Length of handle is 26½ inches from shoulder of blade to end of handle.

No.	C136LWC	C138LWC	C140LWC
Per Dozen	**$20.20**	**$21.00**	**$21.80**
Size No.	6	8	10
Size Blade, inches	13¼x15½	13¾x16½	14¼x17½
Weight per Dozen	64 to 66	68 to 70	74 to 76

No. B703 Wood's Stuart Brand Moly-D Grip Drain Spades

Grade B

Blade is 14 gage steel, heat treated. Handle is X grade, sanded and waxed. Regularly furnished with Moly-D grip.

Size blade, 18 inches. Length handle, 26½ inches from shoulder of blade to end of handle.

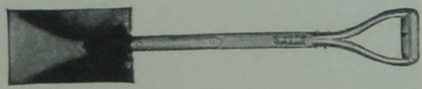
Polished blade and polished straps.

Weight per dozen, 59 to 61 pounds.

No. B703 .... per dozen **$26.40**

Wood's Piqua Brand D Handle Square Point Shovels

Wide Strap, Plain Back, 13-Gage Blade
Grade C



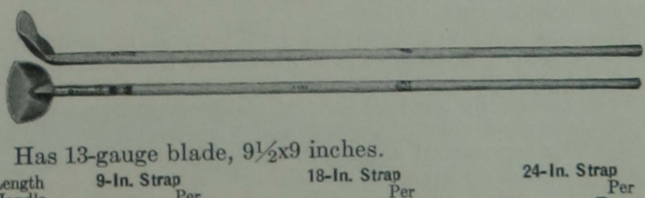
Size blade, 7¼x12 inches.

Approximate weight per dozen, 60 to 62 pounds.

Size No. **2**
No. C62, Polished .... per dozen **$20.30**
No. 6C2, Black .... per dozen **17.50**

Wood's Telegraph Spoons

Wood Brand, Grade A, Heat-Treated
Western Union Pattern—Plain Strap—Plain Back—2-Inch Diameter Extra Heavy Handle
Black Blade and Polished Strap



Has 13-gauge blade, 9½x9 inches.

Length Handle Feet	9-In. Strap		18-In. Strap		24-In. Strap	
	No.	Per Dozen	No.	Per Dozen	No.	Per Dozen
7	A982	**$42.50**	A2082	**$44.50**	A2882	**$46.50**
8	A984	**46.00**	A2084	**48.00**	A2884	**50.00**
9	A986	**49.50**	A2086	**51.50**	A2886	**53.50**
10	A988	**53.00**	A2088	**55.00**	A2888	**57.00**

Wood's Mo-Lyb-Den-Um Steel Shovels

Designed and manufactured for service and economy and possessing these essentially important features.

Hardness.—Every shovel shows a Brinell Hardness of 460 to 512 under test, otherwise it is rejected. Steel at this degree of hardness shows the least abrasive wear. Blades can be made harder or softer, but scientific tests have proven the above range of figures to be best.

Toughness.—It is impractical to manufacture a shovel blade that is hard but brittle. Toughness is as essential as hardness. Shovels are always being subjected to strains for prying purposes, therefore, the blade must be tough. Molybdenum steel, treated by the Wood special process, combines both of these qualities to a degree which other steels do not. Molybdenum blades will not crack nor split in use.

Strength.—The proportion of strength and weight in a shovel blade made of Wood process treated Molybdenum steel is such that a laborer handles more material with less effort than is possible with any other type of shovel. The tensile strength of Wood treated Molybdenum steel is 270,000 to 300,000 pounds, making possible the production of a shovel blade equal to and greater in strength than blades of other steels and yet of less weight. The Wood 14-gauge blade is stronger than the ordinary 12-gauge steel blade. The Wood shovel is from six ounces to more than a pound lighter than competitive grade shovels. It is easy to approximate the increased efficiency derived from this.

Uniformity and Workmanship.—Perfect uniformity was one of the specifications for the special process Molybdenum steel to be developed for the Wood shovel. So successfully is this uniformity provided for that the same degree of hardness and toughness prevails over the whole blade, and not only in one blade, but in 100 per cent of the output.

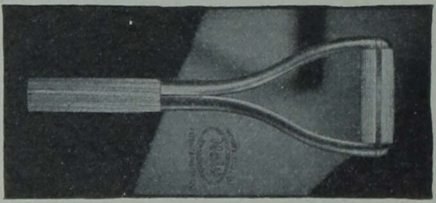
The workmanship and finish is of the best quality.

With Step

This new feature provides an easier rest for the workman's foot, relieving the pressure of the sharp shoulder of the blade and saving one or two pair of shoes annually.

It stiffens and overcomes the flexibility of the blade when prying objects. The turned over shoulder of the blade which forms the step acts as a reinforcement in the form of an angle and prevents the straps from pulling loose from the blade as sometimes occurs in welded strap shovels.

Moly-D Handles



In designing the Moly-D handle two well known principles were incorporated. The first is that a stick of wood is much stronger when a strain is placed against the grain than when applied to it. Any boy hits a ball against the grain of a bat not with it. The second idea came from the hub-band of a wagon wheel. To produce the strongest grip for a band, the blacksmith shrunk the iron or steel band on the hub, and it never gave way.

In this new shovel handle, the grain is perpendicular to the blade or grip and the strain is against the grain, making it almost unbreakable.

The steel band is compressed around the ends of the prongs and in a groove of the grip. The prongs are reinforced by the corrugated steel caps. The prongs are carried to the end, full size, or practically one-half the size of the stem.

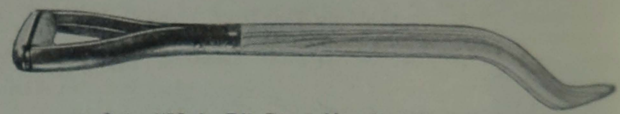
There are no rivets to weaken either the prongs or the grip. The compressed annealed steel band grips tighter and tighter, similar to being heated and shrunk on.

There is practically no metal around the grip to come in contact with the hand, thereby preventing freezing and clinging in cold weather. Grip is wider than standard handles.

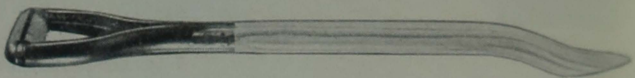
The Moly-D handle is standard on the Wood Molybdenum steel shovel and will be furnished unless otherwise specified.

Prices upon application.

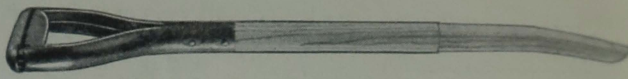
Wood's Grips and Handles



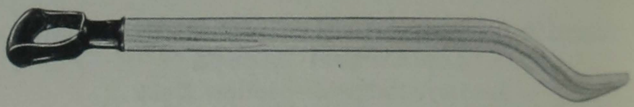
S-1—"Moly-D" Steel Handle, Shovel Bend



S-2—"Moly-D" Steel Handle, Spade Bend



S-3—"Moly-D" Steel Handle, Hollow Back Bend



M-1—Malleable "D" Handle, Shovel Bend

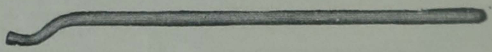
The above numbers are used in specifying No. XX grade handles. If wanted in No. X grade, add the letter "B" as suffix, or for No. 1 grade, add the letter "C." Example: S-2-B or S-1-C.

Standard length of "D" handle is 30 inches. Can furnish "D" handles up to 48 inches, at an additional cost.

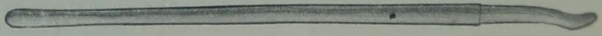
Standard length of long handles is 4½ feet; can be had in 6 to 10 feet at additional cost. Write for prices.

In ordering shovels, spades or scoops equipped with special grips, use list number of article wanted and specify plainly type of grip wanted, as No. 2B2-Moly-D Steel grip, or No. 5C2 Mall. grip.

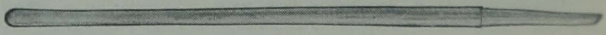
Wood's Standard Weight Shovel and Spade Bend Handles



No. L-1 Shovel Bend Handle



No. L-2 Spade Bend Handle

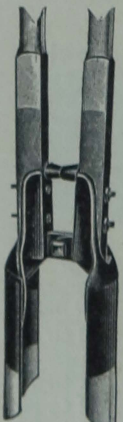


No. L-3 Hollow Back Bend Handle

The above numbers are used in specifying No. XX grade handles. If wanted in No. X grade, add letter B as suffix, or for No. 1 grade, add the letter C. Example: L-2-B or L-1-C.

Standard length, 4½ feet; also in 6 to 10-foot lengths. Prices upon application.

Iwans' Perfection Post Hole Diggers



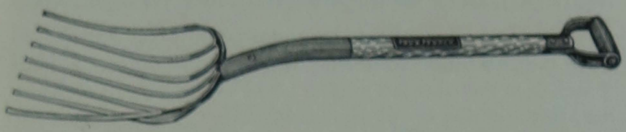
This digger is made of good material, well finished, and is durable and substantial.

The shoulders extending from the upper part of the sockets are provided with mortises and tenons, which interlock, making a firm connection that prevents all side motion when in operation, at the same time preventing the operator from getting his hand pinched.

Weight, per dozen, 110 pounds.

With 4-Foot Handles	per dozen	$24.00
With 7-Foot Handles	per dozen	36.00
Extra Handles	per dozen pairs	5.00

No. 037S True Temper Beet Forks



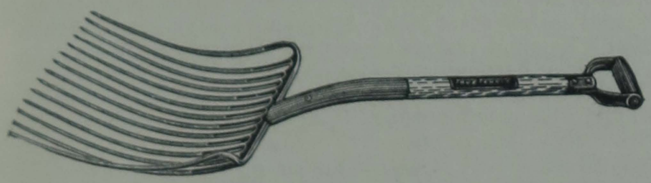
Has 7 round tines, strap ferrules and I.D.L. Steel D handle.

Has a scoop shape, solid ball-pointed tines, tumbled finish. Made of heavy steel.

Tied in bundles of 6 each. Tines are not covered.

Price, No. **037S**. . . . . .per dozen **$33.60**

Coke Forks

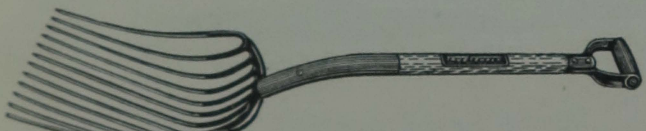


All on 30-inch steel D handles, strap ferrules.

Measurements given are approximately correct, and are made midway the length of the tines—not at the points.

No.	No. Diamond Tines	Length Tines Inches	Width at Center Inches	Space Bet. Tines Inches	Price per Doz.
708	8	16	11½	1¼	**$33.00**
710	10	17	15	1¼	**40.20**
712	12	17	18	1¼	**46.20**
712½	12	16	16	1	**47.40**
714	14	17	20¼	1¼	**53.40**
714½	14	17	18	1	**53.40**
716	16	17	20	1	**64.80**
716½	16	17	18	⅞	**64.80**
718	18	17	20½	⅞	**77.40**
718½	18	16	16	⅝	**77.40**

Coal Scoop Forks



Strap ferrules. Approximate measurements are made midway the length of the tines.

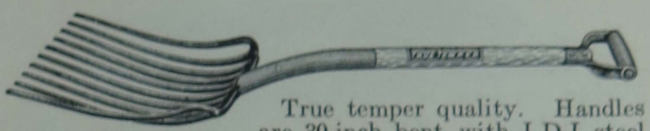
Unless otherwise ordered, all of these forks will be put up with heavy steel D handles.

If coal forks with wood D handles are specified, they will be furnished at an additional cost.

Tied in bundles of 6 each. Tines not covered.

No.	Per Dozen	No. of Diamond Tines	Length Tines Inches	Width Center Inches	Space Between Tines Inches
1010	**$41.40**	10	15	14	1¼
1012	**47.40**	12	16	13½	⅞
1012½	**47.40**	12	16	15½	1
1014	**53.40**	14	16	14	¾
1014½	**53.40**	14	17	18	1
1016	**64.80**	16	16	14	⅝
1016½	**64.80**	16	16	17	¾

Stone or Ballast Forks



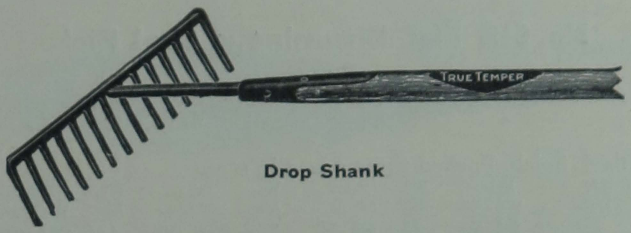
True temper quality. Handles are 30-inch bent, with I-D-L steel D-tops. Strap ferrules.

Measurements given are approximately correct. They are made midway the length of the tines—not at the points.

Square Tines—Black Finish

No.	No. Tines	Length Tines, In.	Width at Center In.	Between Tines, In.	Price per Dozen
98S	8	13½	10½	1⅛	**$33.00**
100S	10	14	13	1⅛	**41.40**
100SC	10	13½	9¾	¾	**41.40**
102S	12	13½	11½	¾	**47.40**
102SW	12	14	13	⅞	**47.40**
104S	14	13½	12	⅝	**53.40**
With SD Malleable D Tops					**6.00**

No. 1014H Steel Asphalt or Tar Rakes

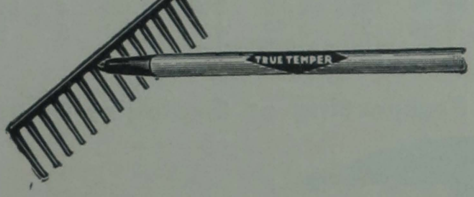


Furnished in both straight and drop-forged patterns with riveted shanks, strap ferrules and ash handles.

Tied in bundles of six each. Heads not covered.

No.	No. Teeth	Length Handle Feet	Price per Dozen
1014H	14	4½ or 5	**$31.80**

Extra Heavy Steel Road Rakes

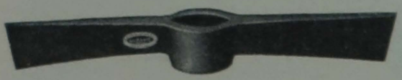


Straight teeth, single shanks, black finish.

Tied in bundles of six each. Heads not covered.

No.	No. Teeth	Length Handles Feet	Price per Dozen
X14	14	5½	**$21.00**
X16	16	5½	**21.60**

Asphalt Mattocks



Oil finish. Packed two dozen to a case.

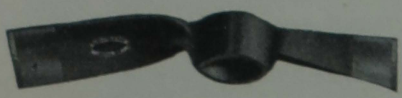
No. 25 Single Eye

Wt. Lbs.	Per Dozen	Length In.	Cutter In.
9	**$21.90**	20	8½x2¾

No. 25A Double Eye

Wt. Lbs.	Per Dozen	Length In.	Cutter In.
10	**$33.90**	20	8½x3

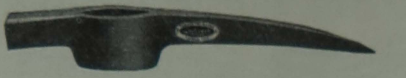
No. 22 Mattocks



Black finish, bevel polished. Packed two dozen to a case.

Weight. . . . . .lbs.	**3**	**4**	**5**	**5**	**6**
Length. . . . . .in.	13	14½	15¾	15¾	16½
Width Hoe. . . . . .in.	3	3¼	3	3½	4
Per Dozen.	**$12.50**	**12.50**	**12.70**	**12.70**	**13.50**

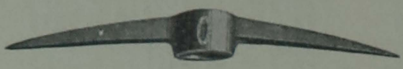
No. 12 Mining or Poll Picks



Packed two dozen to a case.

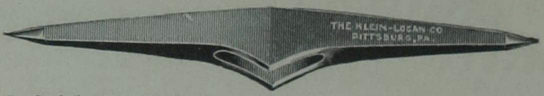
Size	Weight Pounds	Length Inches	Price per Dozen	Size	Weight Pounds	Length Inches	Price per Dozen
2	4	15	$13.00	5	6	17	$16.00
4	5	16	14.50	..	..	..	.....

No. 6 Drifting Picks



No.	Weight Pounds	Length Inches	Price per Dozen	No.	Weight Pounds	Length Inches	Price per Dozen
2	4	21	$10.00	4	5	25	$11.40
3	4½	23	10.50	5	6	26	12.50

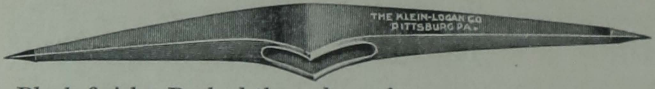
No. 91B Flat Bituminous Coal Picks



Black finish. Packed three dozen in a case.

Wt. Lbs.	Price per Doz.	Wt. Lbs.	Price per Doz.	Wt. Lbs.	Price per Doz.	Wt. Lbs.	Price per Doz.
2	$8.50	2¾	$9.50	3½	$10.00	4½	$11.00
2¼ and 2½	9.00	3	9.50	4	10.50	5	11.50

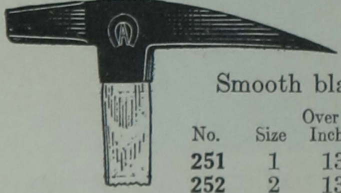
No. 93 Brennan Bituminous Coal Picks



Black finish. Packed three dozen in a case.

Wt. Lbs.	Price per Doz.	Wt. Lbs.	Price per Doz.	Wt. Lbs.	Price per Doz.	Wt. Lbs.	Price per Doz.
2	$8.50	2¾	$9.50	3½	$10.00	4½	$11.00
2¼ and 2½	9.00	3	9.50	4	10.50	5	11.50

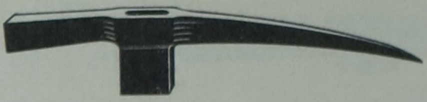
Atha Prospecting or Geologist Picks



Smooth black finish, polished face.

No.	Size	Over All Inches	Wt. Oz.	Std. Package No.	Std. Package Wt., Lbs.	Price Each
251	1	13	16	6	8¼	$1.70
252	2	13	24	6	11¼	1.90

Shift Bosses Moly Steel Sample Picks



We have these picks made special from a design furnished by a well known mine superintendent. They weigh approximately 2½ pounds and have a heavy hammering face, to take the place of a small sledge, and a long tapering pick point. The molybdenum alloy makes the pick exceedingly tough. It outlasts and outwears an ordinary pick 6 to 8 times, both in life and between times necessary for resharpening.

Note the extra long adze eye, which is necessary on account of the tough prying service these picks receive.

Picks are furnished without handles unless otherwise specified.

Pick	each	$4.75
Special 18-Inch Handle	per dozen	3.00

War-Mo Picks

INSTRUCTIONS *for* REDRESSING *and* HARDENING

First Treatment.—If it is desired to have a good tough wearing point for standing shock, heat 5 inches of the pointed end to 1600°-1625° F., or a cherry red, and quench in oil until cold.

Second Treatment.—If it is desired to have a very hard point, heat 1 inch of the point to 1600°-1625° F., or a cherry red, and quench in water until cold.

The eyes and arms of these picks were treated for extreme toughness when made and will not be affected when redressing if care is taken to not overheat the steel.

The first treatment was used in our factory for hardening the points, and we recommend it for general use.

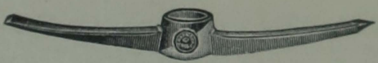
Warwood Molybdenum Steel Picks

A 6-pound molybdenum pick will do the same work as an 8-pound carbon steel pick. A 7-pound molybdenum pick will equal a 9-pound carbon steel pick in digging efficiency.

The deep hardening makes the points wear sharp.

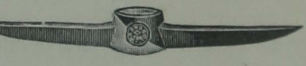
Under very severe usage, War-Mo picks have stayed on the job, without redressing, 6 times as long as ordinary picks.

Railroad Picks



Weight	pounds	6	7	8
Per Dozen		$22.50	24.50	26.50
Length	inches	24	26	27

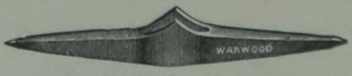
Drifting Picks



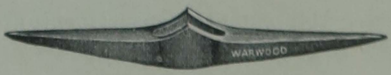
No.		2	3	4
Per Dozen		$19.00	20.00	21.00
Weight	pounds	4	4½	5
Length	inches	22	23	24

War-Mo Coal Picks

Molybdenum Steel



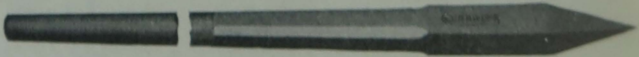
No. 34-B Flat Pattern



No. 36-C Brennen Pattern

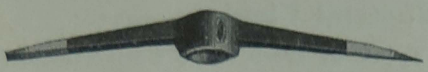
Size	lbs.	2½	3	3½	4	4½
Per Dozen		$14.08	15.20	16.00	17.12	17.92

No. 42 Round or Diamond Point Lining Bars



Weight	pounds	18	20	26
No. 42	each	$2.00	2.32	2.96
Square	inches	1¼	1¼	1½
Length	feet	5	5¼	5½

Standard Railroad Picks

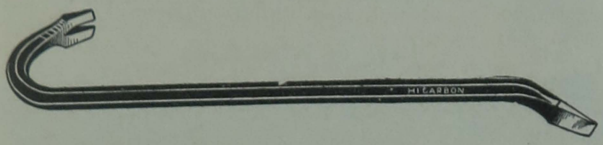


Packed 2 dozen to a case.

Weight.......pounds	5	6	7	8	9	10
Per Dozen..........	$11.20	11.80	12.20	14.00	15.80	17.10
Length........inches	21	23	25	26	27	28

Goose Neck Ripping Bars

Hi-Carbon



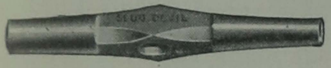
Made of hexagon tool steel, drop-forged.
Will not easily bend or break.
Body black baked japan; rustproof ends are bright red.
Packed in bulk.

No................	112	118	124	130	136	2136
Per Dozen...........	$6.00	7.00	8.00	9.00	10.00	14.00
Size...........inches	½x12	⅝x18	¾x24	¾x30	¾x36	⅞x36
Weight........pounds	1	1¾	3½	4¼	5	7

No. 101-X Warren Slug Devil Spike Mauls

Polished Faces

Made of extra quality alloy steel; will outwear at least three regular carbon steel mauls. At 200,000 blows faces show no cracking, etc.

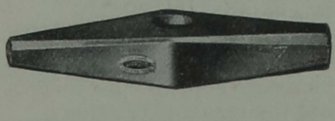


Wt. Lbs.	Each	Lgth. In.	Face, In. Small	Face, In. Large
8	$2.10	13	1³⁄₁₆	1½
10	2.10	15	1¼	1⅝

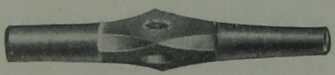
No. 100 Standard Pattern Railroad Spike Mauls

Polished Faces

Wt. Lbs.	Price Each	Lgth. In.	Face, In. Small	Face, In. Large
6	$1.16	11	¹¹⁄₁₆	1⅜
8	1.34	12	¾	1½
10	1.62	12¾	1	1¾

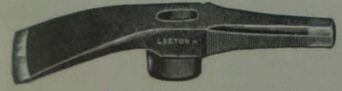


No. 101 Bell Pattern Spike Mauls



8-Pound.................................each **$1.44**
10-Pound................................each **1.70**

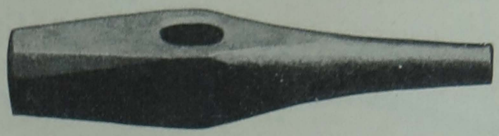
No. 227 Leetonia Trackmen's Adzes



A useful tool for trackmen who keep the main haulage road in repair. Forged from solid piece of tool steel. Head and cutting edge carefully tempered. Handles furnished on request.

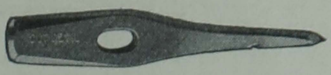
Wt. Lbs.	Price Each	Wt. Lbs.	Price Each	Wt. Lbs.	Price Each	Wt. Lbs.	Price Each
3	$4.00	3½	$4.00	4	$4.25	5	$4.25

No. 156 Round Track Punches



High grade tool steel, heat treated.
Length, 11 inches; punch ¾ inch; weight, 5 pounds.
No. 156.......................................each **$2.36**

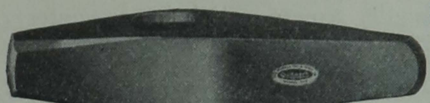
No. 160-AX Cut-Devil Slim Pattern Track Chisels



Made of extra quality steel.

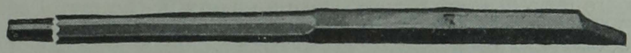
Weight, 5½ pounds. Length, 10½ inches; bit, 1⅜ inches.
No. 160-AX.......................................each **$3.50**

No. 160 Warren Track Chisels

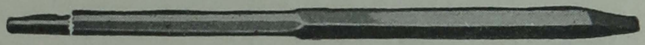


Weight................................lbs.		5½	6½
No. 160................................each		$2.08	2.56
Length................................in.		9¼	10½
Bit................................in.		1⅛	1⅛

Crow Bars



No. 41, Pinch Point



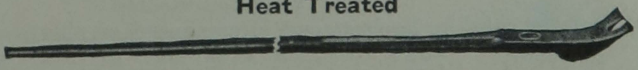
No. 40, Wedge Point

Pinch Point Only

Weight Pounds	Each	Square Inches	Length Feet	Weight Pounds	Each	Square Inches	Length Feet
3	$.58	¾	2	6	$.86	⅞	3
4	.66	¾	2½	8	.98	1	3½
Wedge and Pinch Point							
10	$1.20	1	4	20	$2.32	1¼	5¼
12	1.36	1⅛	4¼	24	2.46	1⅜	5½
14	1.52	1⅛	4½	26	2.96	1½	5½
16	1.76	1¼	4¾	30	3.60	1½	6
18	2.00	1¼	5	..	....	...	...

No. 43 Claw Bars with Heel

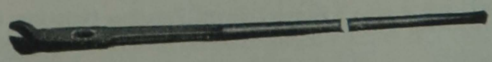
Heat Treated



Length........................inches	48	54	60
No. 43........................each	$3.08	3.86	4.34
Size Spike........................	½	⅝	⅝
Weight........................pounds	20	25	30

No. 43-C Coal Mine Spike Bars

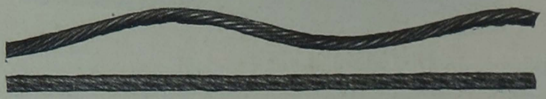
Oil Tempered Claw



Length...................................inches	36
Size Spike...................................inches	⅜
Weight Each...................................pounds	8
No. 43-C...................................each	**$1.66**

Broderick & Bascom Types of Wire Rope Construction Most Commonly Used in the Mining, Contracting, and Industrial Field

Flex-Set Preformed Wire Rope



There are two ways of making wire rope. First, by the standard process. Second, by preforming.

The wire for standard construction wire rope is exactly the same as that for Flex-Set Preformed wire rope. The strands are made the same way. The difference occurs at the next step of manufacture. The strands of standard construction wire rope are forcibly twisted around a hemp core. The strands of Flex-Set are preformed, shaped and set to the helical form which they retain permanently in the finished rope.

From the manufacturing standpoint, this is the sole difference between rope made by the standard process and rope made by the preforming process. In practical every-day use, however, there is considerable difference in their behavior.

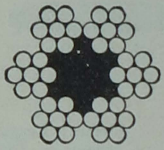
Flex-Set Preformed construction has 12 outstanding advantages:

No. 1: easier to handle, No. 2: installed more quickly. No. 3: 80 per cent pre-broken in. No. 4: withstands severe bending. No. 5: less subject to fatigue. No. 6: less apt to kink. No. 7: spools more evenly, runs more smoothly. No. 8: quickly, easily, perfectly spliced and socketed. No. 9: can be handled more safely. No. 10: makes Lang Lay more practical. No. 11: makes independent wire rope center more practical. No. 12: lasts longer, saves money.

All grades of Broderick & Bascom wire rope may be had preformed. Prices upon application.

Types of Wire Rope Construction

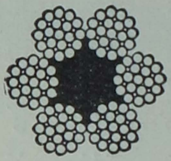
Illustrated below are cross sections showing the construction of the types of wire rope most in demand for mine use. Wire rope of special construction or any of the many other B & B types are available through this company. There are no working requirements for wire rope which cannot be met by Broderick & Bascom wire rope products.



6x7

Haulage and Standing Rope

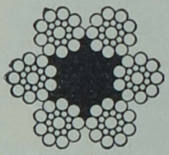
This construction is composed of six strands of seven wires each, laid around a hemp center and is used where there is much abrasive wear, large drums, and flexibility is not important, as for mine haulage, guys, etc.



6x19

Filler Wire Construction

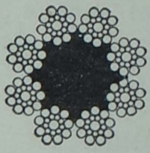
Each strand is composed of wires approximately the same size; the center wire is slightly larger. The six small filler wires are used to support the outer twelve wires at the interstices above the seven inner wires and are not considered component wire in the rope so far as strength is concerned. This type always furnished unless otherwise specified.



6x19

Seale Construction

Each strand is composed of nine large outer wires, nine small inner wires and one larger center wire. This type wire rope is highly satisfactory where abrasion is a governing factor and is not furnished unless specified.

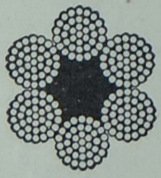


8x19

Seale Construction

Each of the eight strands are composed of nine large outer wires, nine smaller inner wires and one large center wire.

This type of construction is especially recommended on traction type elevators.

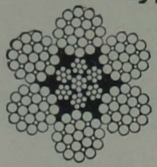


6x37

Special Extra Flexible Hoisting Rope

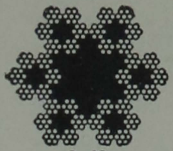
Composed of six strands of 37 wires each, laid around a hemp core, and used where extreme pliability is required. While its breaking strength is greater than the 8x19 construction, the outer wires are smaller and will not stand as much surface wear.

Types of Wire Rope Construction



Wire Rope Center

All the preceding types of construction illustrated are shown with hemp center. The substitution of a wire rope center increases the rope's ability to resist crushing and also increases the strength.

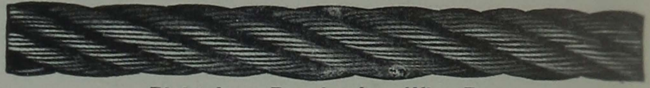


6x42

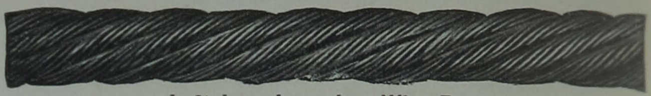
Wire Tiller Rope

Composed of six individual ropes laid about a hemp core, each of these ropes consisting of six strands of seven wires per strand, also laid about hemp cores.

Lays of Wire Rope



Right Lay, Regular Lay Wire Rope



Left Lay, Lang Lay Wire Rope

By the lay is meant the direction or twist of the wires and strands composing the rope. A wire rope is termed Right Lay when the strands twist from left to right and Left Lay when they twist from right to left.

A Regular Lay wire rope is one in which the wires in each strand twist in the opposite direction from the strands themselves.

A Lang Lay wire rope is one in which the wires of each strand and the strands themselves twist in same direction.

These arrangements make possible four combinations, namely: Right Lay, Regular Lay; Left Lay, Regular Lay; Right Lay, Lang Lay; and Left Lay, Lang Lay. All B & B wire rope is obtainable in any of these combinations of arrangement.

Only those most in demand, Right Lay, Regular Lay and Right Lay, Lang Lay are carried in warehouse stocks. Complete stocks of all standard types, sizes and lays are available through this company from the manufacturer.

Proper Sizes of Sheaves and Drums for Wire Rope

Average Diameters Recommended

	Times Rope Diameter	
	Max.	Min.
For 6x 7 Rope	72	42
For 6x19 Rope	45	30
For 8x19 Rope	31	21
For 6x37 Rope	27	18

Diameters larger than the minimums listed above will give increased rope life and more economical service. If in doubt ask for recommendations.

Proper Working Loads

To determine proper working load, divide breaking strength in tons by factor of safety, which ordinarily is 5.

Trade Grades of B & B Wire Rope

The trade grades of B & B wire rope are Yellow Strand Powersteel, Plow Steel, Extra Strong Cast Steel, Cast Steel and Iron. Wire rope is manufactured in such types and of such materials as best meet physical requirements in use.

Splicing and Socketing

In order to secure the utmost efficiency from wire rope, and insure safety to life, limb and property, the importance of having this work done right cannot be overestimated.

The Broderick & Bascom Rope Co. has all the facilities for turning out a neat, workmanlike, sound and safe job.

Tapering Wire Rope Ends

Diam. Rope Inches	For Tapering Each	Diam. Rope Inches	For Tapering Each	Diam. Rope Inches	For Tapering Each
1/4 & 5/16	$.45	1	$1.25	1 3/4	$4.50
3/8	.50	1 1/8	2.00	2	5.25
7/16 & 1/2	.60	1 1/4	2.50	2 1/8	5.75
9/16 & 5/8	.65	1 3/8	3.00	2 1/4	6.50
3/4	.75	1 1/2	3.50	2 1/2	8.00
7/8	1.00	1 5/8	4.00	...	....

Wire Rope

Proper Working Loads

It is never advisable for the working load of a wire rope for general purposes, particularly running ropes, to exceed 1/5 of the breaking strength. This means that the factor of safety should be not less than 5. To determine proper working load, divide the breaking strength by the proper factor of safety; e.g., a 7/8-inch diameter 6x19 plow steel rope has a breaking strength of 28 tons and with a factor of safety of 5 the proper working load would be not over 5.6 tons.

Factors of safety in excess of 5, varying up to 8 and even more, are often required for safe and economical operation. The proper factor of safety for a wire rope should be determined by careful and thorough consideration of all pertinent data. Such data should include all loads, acceleration, deceleration, rope speed, rope attachments, the number, size and arrangement of all sheaves and drums, existing conditions causing corrosion and abrasion, length of rope in service, economical rope life and the degree of danger to life and property.

No fixed arbitrary values for factor of safety can be properly set for various classifications of service. These can safely vary, within limits, with the conditions present on individual installations.

Proper Sizes of Sheaves and Drums

Sheaves and drums should be carefully examined for proper size, free running and proper groove diameters for most economical wire rope service. It is advisable to design the sheave and drum equipment so that the tread diameters are approximately as follows:

Average Diameters Recommended

For 6x 7 Rope, 72 times Rope Diameter
For 6x19 Rope, 45 times Rope Diameter
For 6x37 Rope, 27 times Rope Diameter
For 8x19 Rope, 31 times Rope Diameter

Various service conditions allow, and often require for economical service, changes from these diameters. For example, on larger hoisting installations, sheaves for use with 6x7 rope are sometimes set at 96 times the rope diameter and, for 6x19 rope, are sometimes set as 90 times rope diameter.

It is also true that for certain classes of service ratios smaller than these are possible and economical, but it is advisable never to allow the sheave and drum diameters to be set below the following:

Minimum Diameters

For 6x 7 Rope, 42 times Rope Diameter
For 6x19 Rope, 30 times Rope Diameter
For 6x37 Rope, 18 times Rope Diameter
For 8x19 Rope, 21 times Rope Diameter

It should be thoroughly appreciated that diameters larger than those listed as minimum will give increased rope life, and consequently more economical service.

General Information About the Use and Care of Wire Rope

Uncoiling and Unreeling

Wire rope must not be coiled or uncoiled like a hemp rope for it will kink or untwist. When in a coil, roll on the ground like a wheel or hoop. When on a reel, mount the reel so that it will revolve, and run rope off slowly straight ahead.

Kinking

Do not allow a wire rope to kink, for ill effects will be sure and often sudden.

Cutting

When wire rope is to be cut great care should be taken to securely bind the rope on each side of the place where it is to be cut with soft wire, so as to prevent the rope from untwisting or the strands from getting out of place.

Lubrication

Wire rope should be lubricated both when in use and when idle. A proper lubricant will not only protect the outer wires against action of moisture, water, acids, etc., but will also work in between the wires and the hemp center, protecting them as well as oiling the points of friction.

Price Differentials on Wire Rope

The following differentials apply on all wire rope prices quoted in this catalog:

When ropes are made with **wire strand center,** add 15 per cent to the price. When made with a **wire rope center,** add 15 per cent to the price.

For ropes of more than 19 wires to the strand and less than 37 wires, unless specially listed herein, apply list for 37 wire rope.

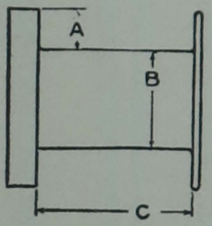
For ropes of more than 37 wires per strand, add 10 per cent to 37 wire list before applying discount.

Ropes not listed, having six strands of more than 7 and less than 37 wires to the strand, take 19 wire list.

Sizes not listed take list of the next larger size.

Flex-Set Performed ropes are sold at special net prices. Prices upon application.

How to Estimate Cable Capacity of Hoist Drums



The following rule will be found applicable in determining the cable capacity of any size drum.

Rule: Add the diameter of the drum, B, to the depth of the flange, A.

Multiply this sum by the depth of the flange A, and multiply the result by the length between flanges C; all in inches. Multiply the product by the figures in the right-hand column opposite the size cable wanted, in the table below.

Size Cable Inches	Multiply by	Size Cable Inches	Multiply by
¼	4.16	1⅜	.138
⅜	1.86	1½	.116
7/16	1.37	1⅝	.099
½	1.05	1¾	.085
9/16	.828	1⅞	.074
⅝	.672	2	.066
¾	.465	2⅛	.058
⅞	.342	2¼	.052
1	.262	2⅜	.046
1⅛	.207	2½	.042
1¼	.167	...	....

Example: (B plus A)×A×C×figure opposite size of required cable=number of feet of the specified size cable that drum will hold.

AERIAL TRAMWAYS

Our long experience enables us to select proper grades and constructions of wire rope for various types of tramways. Send us your inquiries.

Broderick & Bascom Wire Rope

Yellow Strand Powersteel Hoisting Rope

6 Strands, 19 Wires to the Strand, 1 Hemp Core

“YELLOWSTRAND”
“POWERSTEEL” WIRE ROPE

Yellow Strand steel rope is made from special wire meeting requirements of 240000 to 260000 pounds tensile strength per square inch. Recommended for deep shafts, inclines, derricks and other places where unusual strength is demanded.

Diam. In.	Per Foot	Circum. In.	Approx. Wt., Lbs. per Ft.	Approx. Strength Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave Advised Ft.
¼	$.13	¾	.10	2.9	See Explanatory Note	See Explanatory Note
5/16	.13½	1	.16	4.5		
⅜	.14½	1⅛	.23	6.3		
7/16	.15½	1¼	.31	8.4		
½	.17	1½	.40	10.8		
9/16	.19	1¾	.51	13.5		
⅝	.22½	2	.63	16.6		
¾	.31	2¼	.90	23.7		
⅞	.39	2¾	1.23	32.2		
1	.50	3	1.60	42.		
1⅛	.62	3½	2.03	53.		
1¼	.75	4	2.50	65.		
1⅜	.90	4¼	3.03	78.5		
1½	1.10	4¾	3.60	92.5		
1⅝	1.30	5	4.23	108.		
1¾	1.60	5½	4.90	124.		
1⅞	1.75	5¾	5.63	142.		
2	1.85	6¼	6.40	161.		
2¼	2.50	7⅛	8.10	202.		
2½	2.80	7⅞	10.	246.		
2¾	3.45	8⅝	12.10	294.		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center, any construction, add 15%.

Broderick & Bascom Wire Rope

Yellow Strand Powersteel Special Extra Flexible Rope

6 Strands, 37 Wires to the Strand, 1 Hemp Core

“YELLOWSTRAND”
“POWERSTEEL” WIRE ROPE

This steel rope combines great flexibility with Yellow Strand Powersteel strength. Recommended for heavy hoisting and other work demanding greatest strength in combination with unusual flexibility.

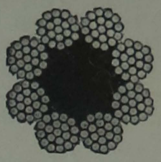
Diam. In.	Per Foot	Circum. In.	Approx. Wt., Lbs. per Ft.	Approx. Strength Tons of 2000 Lbs.	Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave Advised Ft.
⅜	$.17½	1⅛	.22	6.1	See Explanatory Note	See Explanatory Note
7/16	.18½	1¼	.30	8.3		
½	.20	1½	.39	10.6		
9/16	.23	1¾	.49	13.2		
⅝	.27	2	.61	16.1		
¾	.36	2¼	.87	22.8		
⅞	.46	2¾	1.19	30.5		
1	.59	3	1.55	39.5		
1⅛	.75	3½	1.96	49.9		
1¼	.86	4	2.42	61.5		
1⅜	1.05	4¼	2.93	74.3		
1½	1.25	4¾	3.49	88.2		
1⅝	1.45	5	4.09	103.3		
1¾	1.75	5½	4.75	119.5		
2	2.10	6¼	6.20	155.		
2¼	2.75	7⅛	7.85	194.		
2½	3.15	7⅞	9.69	237.		
2¾	3.75	8⅝	11.72	285.		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center, add 15%, to list price.

Broderick & Bascom Wire Rope

Extra Flexible Yellowstrand Powersteel Rope

8 Strands, 19 Wires to the Strand, 1 Hemp Core



This construction of rope is more flexible but not as strong as the regular 6x19 construction. Should not be used on drums where there is much overwinding as it tends to flatten and lose shape.

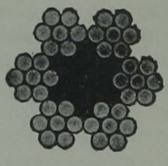
Diam. In.	Per Ft.	Circum. In.	Approx. Wt., Lbs. per Ft.	Strength Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave Advised Ft.
⅜	$.16½	1⅛	.20	5.45	See Explanatory Note	See Explanatory Note
½	.19	1½	.36	9.5		
9/16	.22	1¾	.46	11.8		
⅝	.25	2	.57	14.4		
¾	.34	2¼	.82	20.5		
⅞	.43	2¾	1.11	27.6		
1	.55	3	1.45	35.8		
1⅛	.68	3½	1.84	45.2		
1¼	.82	4	2.27	55.7		
1⅜	.98	4¼	2.74	67.		
1½	1.19	4¾	3.26	79.5		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center any construction, add 15%.

Broderick & Bascom Wire Rope

Coarse Laid Yellow Strand Powersteel Rope

6 Strands, 7 Wires to the Strand, 1 Hemp Core



Wherever extra heavy work is to be done—logging, mining and other heavy hoisting, Yellow Strand is recommended.

It is made from highest grade steel wire and meets the requirement of 240000 to 260000 pounds tensile strength per square inch.

The wires, the cores of the strands, the strands, all are round—the only form which permits of bending in every direction with equal strain.

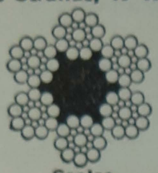
Diam. In.	Price per Ft.	Approx. Circum. In.	Approx. Wt., Lbs. per Ft.	Strength Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave in Feet Advised
⅜	$.08¾	1⅛	.21	5.9	See Explanatory Note	See Explanatory Note
7/16	.11½	1¼	.29	7.9		
½	.13½	1½	.38	10.3		
9/16	.17	1¾	.48	13.		
⅝	.20½	2	.59	16.		
¾	.28½	2¼	.84	22.8		
⅞	.37	2¾	1.15	30.8		
1	.48	3	1.50	40.		
1⅛	.58	3½	1.90	50.		
1¼	.72	4	2.34	61.		
1⅜	.88	4¼	2.84	73.5		
1½	1.05	4¾	3.38	86.5		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center, any construction, add 15%.

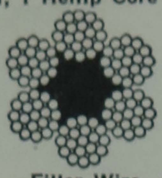
Broderick & Bascom Wire Rope

Iron and Traction Steel Elevator Rope

6 Strands, 19 Wires to the Strand, 1 Hemp Core



Seales



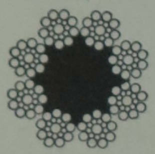
Filler Wire

Diam. In.	Iron: Per Foot	Iron: Strength Tons of 2000 Lbs.	Traction Steel: Per Foot	Traction Steel: Strength Tons of 2000 Lbs.	Diam. Drum or Sheave Feet Advised and Work. Load
3/16	$.06	55	.....	.....	See Explanatory Note
¼	.06½	.97	.....	.....	
5/16	.06¾	1.43	.....	.....	
⅜	.07½	2.05	$.09½	4.1	
7/16	.08½	2.76	.10½	5.5	
½	.09½	3.57	.12	7.25	
9/16	.11½	4.49	.13¾	9.25	
⅝	.13½	5.52	.15¾	11.5	
¾	.17	7.86	.20½	16.	
⅞	.21	10.6	.25	21.	
1	.26	13.7	.31	27.	

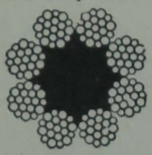
Broderick & Bascom Wire Rope

Iron and Traction Steel Elevator Rope

8 Strands, 19 Wires to the Strand, 1 Hemp Core



8x19 Seales



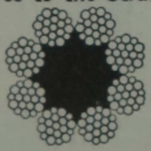
8x19 Warrington

Diam. In.	Iron: Per Foot	Iron: Strength Tons of 2000 Lbs.	Traction Steel: Per Foot	Traction Steel: Strength Tons of 2000 Lbs.	Diam. Drum or Sheave Feet Advised and Work. Load
¼	$.07	.8	.....	....	See Explanatory Note
5/16	.074	1.1	.....	....	
⅜	.08½	1.6	$.10½	3.7	
7/16	.09½	2.4	.12	5.	
½	.11	3.28	.13½	6.5	
9/16	.13	4.06	.15½	8.	
⅝	.15½	4.86	.17½	10.	
¾	.19½	6.95	.23	14.	
⅞	.23	9.4	.28	19.	
1	.29	12.2	.34	25.	

Broderick & Bascom Wire Rope

Plow Steel Extra Flexible Hoisting Rope

8 Strands, 19 Wires to the Strand, 1 Hemp Core

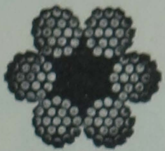


Diam. In.	Per Foot	Approx. Circum. Inches	Approx. Wt., Lbs. per Ft.	Strength Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave Advised Feet
¼	$.14¼	¾	.09	2.15		
5/16	.14½	1	.14	3.34	See Explanatory Note	See Explanatory Note
⅜	.15	1⅛	.20	4.7		
7/16	.17	1¼	.28	6.3		
½	.18¼	1½	.36	8.2		
9/16	.21	1¾	.46	10.3		
⅝	.24	2	.57	12.5		
¾	.32½	2¼	.82	17.8		
⅞	.41	2¾	1.11	24.		
1	.50	3	1.45	31.2		
1⅛	.62	3½	1.84	39.4		
1¼	.75	4	2.27	48.4		
1⅜	.90	4¼	2.74	58.3		
1½	1.06	4¾	3.26	69.		

Broderick & Bascom Wire Rope

Cast Steel Hoisting Rope

6 Strands, 19 Wires to the Strand, 1 Hemp Core



Splendid for water well drilling and sand lines. Seldom used for hoisting unless the work is intermittent and comparatively light.

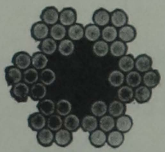
Diam. Inches	Per Foot	Circum. Inches	Approx. Wt. per Ft., Lbs.	Strength Tons of 2000 Lbs.	Working Load in Tons of 2000 Lbs.	Diam. Sheave Advised Ft.
¼	$.09	¾	.10	2.1		
5/16	.09¼	1	.16	3.2		
⅜	.09½	1⅛	.23	4.5		
7/16	.10½	1¼	.31	6.		
½	.12	1½	.40	7.7		
9/16	.13¾	1¾	.51	9.6	See Explanatory Note.	See Explanatory Note.
⅝	.15¾	2	.63	11.8		
¾	.20½	2¼	.90	16.8		
⅞	.25	2¾	1.23	22.8		
1	.31	3	1.60	29.5		
1⅛	.38	3½	2.03	37.		
1¼	.46	4	2.50	46.		
1⅜	.56	4¼	3.03	55.		
1½	.66	4¾	3.60	65.		
1⅝	.77	5	4.23	76.		
1¾	.90	5½	4.90	88.		
1⅞	1.02	5¾	5.63	100.		
2	1.16	6¼	6.40	114.		
2¼	1.44	7⅛	8.10	144.		
2½	1.75	7⅞	10.	176.		
2¾	2.10	8⅝	12.10	212.		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center, add 15%, to list price.

Broderick & Bascom Wire Rope

Cast Steel Haulage and Sand Line Rope

6 Strands, 7 Wires to the Strand, 1 Hemp Core



Composed of 6 strands of 7 wires per strand, laid about a hemp core. Principally used for mine haulage, derrick guys, ships' rigging, sand lines, etc.

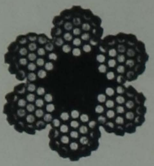
Diam. Inches	Per Foot	Circum. Inches	Approx. Wt. per Ft., Lbs.	Strength Tons of 2000 Lbs.	Working Load in Tons of 2000-Lbs.	Diam. Sheave Advised Ft.
¼	$.04	¾	.094	2.		
9/32	.04¼	⅞	.12	2.52		
5/16	.04½	1	.15	3.1		
⅜	.05¾	1⅛	.21	4.3	See Explanatory Note.	See Explanatory Note.
7/16	.07	1¼	.29	5.8		
½	.09	1½	.38	7.5		
9/16	.11½	1¾	.48	9.4		
⅝	.13½	2	.59	11.5		
¾	.18½	2¼	.84	16.5		
⅞	.23	2¾	1.15	22.4		
1	.29	3	1.50	29.		
1⅛	.36	3½	1.90	36.4		
1¼	.43	4	2.34	44.5		
1⅜	.51	4¼	2.84	53.		
1½	.60	4¾	3.38	62.5		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center, add 15%, to list price.

Broderick & Bascom Wire Rope

Plow Steel Hoisting Rope

6 Strands, 19 Wires to the Strand, 1 Hemp Core



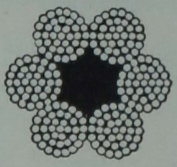
Diam. In.	Per Foot	Circum. In.	Approx. Wt., Lbs. per Ft.	Strength Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave in Feet Advised
¼	$.12	¾	.10	2.5	See Explanatory Note	See Explanatory Note
5/16	.12¼	1	.16	3.9		
⅜	.13	1⅛	.23	5.5		
7/16	.14	1¼	.31	7.3		
½	.16	1½	.40	9.4		
9/16	.18¼	1¾	.51	11.7		
⅝	.21	2	.63	14.4		
¾	.28	2¼	.90	20.6		
⅞	.34½	2¾	1.23	28.		
1	.43	3	1.60	36.5		
1⅛	.54	3½	2.03	46.		
1¼	.65	4	2.50	56.5		
1⅜	.79	4¼	3.03	68.		
1½	.93	4¾	3.60	80.5		
1⅝	1.08	5	4.23	94.		
1¾	1.30	5½	4.90	108.		
1⅞	1.46	5¾	5.63	123.		
2	1.58	6¼	6.40	140.		
2¼	2.00	7⅛	8.10	176.		
2½	2.50	7⅞	10.	214.		
2¾	3.00	8⅝	12.10	256.		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center, add 15%, to list price.

Broderick & Bascom Wire Rope

Plow Steel Special Extra Flexible Rope

6 Strands, 37 Wires to the Strand, 1 Hemp Core

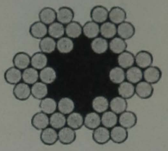


Diam. In.	Per Foot	Circum. In.	Approx. Wt., Lbs. per Ft.	Strength Tons of 2000 Lbs.	Proper Working Load in Tons of 2000 Lbs.	Diam. Drum or Sheave in Feet Advised
⅜	$.17	1⅛	.22	5.3	See Explanatory Note.	See Explanatory Note.
7/16	.17¾	1¼	.30	7.2		
½	.19	1½	.39	9.2		
9/16	.22½	1¾	.49	11.5		
⅝	.25	2	.61	14.		
¾	.34	2¼	.87	19.8		
⅞	.43	2¾	1.19	26.5		
1	.52½	3	1.55	34.4		
1⅛	.66	3½	1.96	43.5		
1¼	.78	4	2.42	53.5		
1⅜	.93	4¼	2.93	64.6		
1½	1.15	4¾	3.49	76.7		
1⅝	1.25	5	4.09	89.8		
1¾	1.50	5½	4.75	104.		
2	1.80	6¼	6.20	135.		
2¼	2.20	7⅛	7.85	168.		
2½	2.75	7⅞	9.69	206.		
2¾	3.30	8⅝	11.72	248.		

Broderick & Bascom Wire Rope

Plow Steel Haulage Rope

6 Strands, 7 Wires to the Strand, 1 Hemp Core

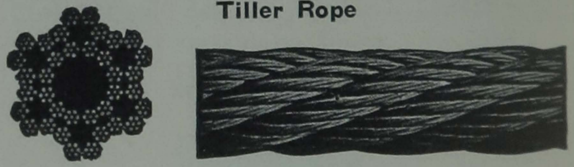


Diam. Inches	Per Foot	Circum. Inches	Approx. Wt. per Ft., Lbs.	Strength Tons of 2000 Lbs.	Working Load, Tons 2000 Lbs.	Diam. Drum or Sheave Advised Ft.
9/32	$.06¼	⅞	.12	2.95	See Explanatory Note.	See Explanatory Note.
5/16	.06½	1	.15	3.65		
⅜	.08	1⅛	.21	5.15		
7/16	.10½	1¼	.29	6.9		
½	.12½	1½	.38	9.		
9/16	.16¼	1¾	.48	11.3		
⅝	.19	2	.59	13.8		
¾	.26	2¼	.84	19.8		
⅞	.32½	2¾	1.15	26.8		
1	.41	3	1.50	34.8		
1⅛	.51	3½	1.90	43.6		
1¼	.62	4	2.34	53.		
1⅜	.76	4¼	2.84	63.5		
1½	.90	4¾	3.38	75.		

For galvanized, add 25%; for wire strand center, add 15%; wire rope center any construction, add 15%.

Broderick & Bascom Wire Rope

Tiller Rope



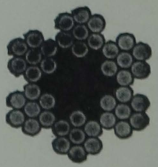
Six small standing ropes are laid around a hemp heart, thus forming a rope of 252 wires.

Diam. Rope In.	Aver. Wt. per Ft. Lbs.	Price, per Ft. Iron	Price, per Ft. Cast Steel	Diam. Rope In.	Aver. Wt. per Ft. Lbs.	Price, per Ft. Iron	Price, per Ft. Cast Steel
¼	.07	$.07½	$.11	⅝	.43	$.17	$.24
5/16	.11	.08	.12½	¾	.62	.22	.30
⅜	.16	.09	.14	⅞	.84	.27	.36
7/16	.21	.10	.15	1	1.10	.33	.43
½	.28	.11½	.17	...	....	...	...
9/16	.35	.14	.20	...	....	...	...

Broderick & Bascom Wire Rope

Iron and Galvanized Sash and Bell Cord

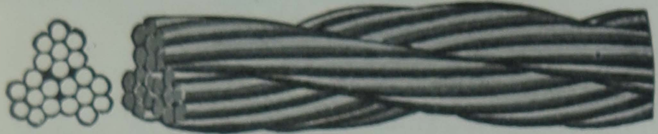
6 Strands, 7 Wires to the Strand, 1 Cotton Core



Diameter Inches	Iron per Foot	Galvanized per Foot	Breaking Strength Pounds	Weight Pounds per Foot
1/16	$.01¼	$.01¾	140	.006
3/32	.01½	.02	315	.013
⅛	.01¾	.02¼	560	.023
5/32	.02	.02¾	840	.038
3/16	.02¼	.03	1150	.053
7/32	.02¾	.03½	1570	.072
¼	.03	.04	2040	.094

Broderick & Bascom Galvanized Guard Rail Rope

3 Strands—7 Wires to the Strand

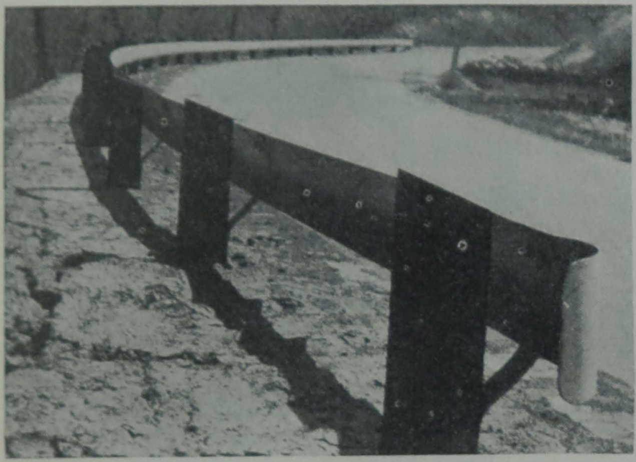


This rope has been adopted as standard in many states as guard rail cable along highways. Three-quarter-inch 3x7 is generally used, although one-inch 6x7 can also be furnished.

Guard Rail Hardware

We stock and furnish all guard rail hardware such as end post sets, intermediate bracing and take-up sets. These are furnished according to the state specifications where used.

Tuthill Highway Guard



This convexed steel rail guard is mounted on specially designed overload cantilever-type springs bolted to the posts at the point of greatest strength—near the ground line. Its great resiliency cushions the shock of the impact, transmitting its force to the ground level and virtually absorbing it, while deflecting the car back to the road with usually insignificant damage to the car or rail.

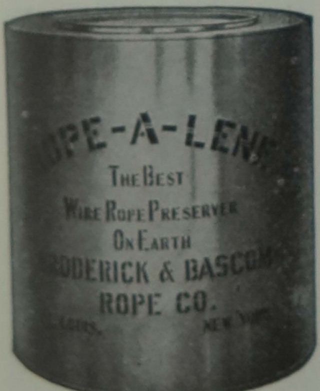
The low spring mounting feature permits the posts to withstand shocks that would often break them off with ordinary guard equipment. This guard never stops a car short or even checks its speed suddenly.

A curved end piece, protecting the end section, completes the construction simply and effectively. Slotted bolt holes in the rails provide for ample expansion and contraction under the most severe conditions imaginable.

Curved surfaces multiply the visibility of light rays and reflect the rays to promote clear, safe vision.

Additional information and prices upon application.

Rope-A-Lene



Base is high grade cylinder oil of 600° fire test. With this is compounded secret valuable ingredients, together with a flaked mica-like substance that will not work into lumps.

Protects wires against internal wear, preventing corrosion by keeping out moisture and adding to life of hemp core by waterproofing and lubricating it.

Size Pkg........lbs.	10	25	50	100	½ Bbl.	1 Bbl.
Per Lb............	$.30	.28	.26	.24	.20	.18

Broderick & Bascom Galvanized Strand or Guy Wire

Composed of 7 Wires

For guys, signal cord, street railway, telephone companies, electric light plants, fencing, etc.

Galvanized strands made of wire having a tensile strength of 60000 to 350000 pounds can also be furnished.

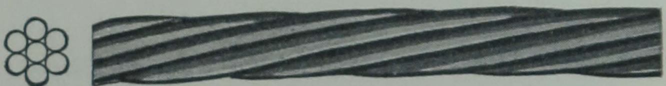
Diameter Inches	Approx. Strength Pounds	Wt., Lbs. per 1000 Feet	Price per 100 Feet
⅛	540	31.8	1.00
5/32	870	51.3	1.15
3/16	1150	72.9	1.25
7/32	1540	98.3	1.50
¼	1900	121.	1.75
5/16	3200	205.	2.50
⅜	4250	273.	3.50
7/16	5700	399.	4.50
½	7400	517.	5.50

For strands of larger diameter or of a greater number of wires than given above, write for prices.

Broderick & Bascom Wire Rope

Siemens-Martin Extra Galvanized Strand

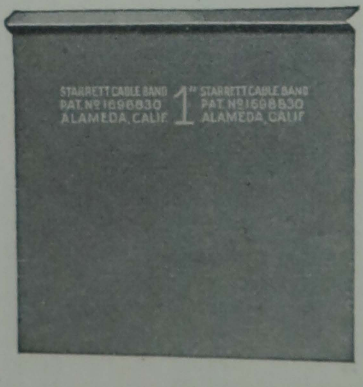
7 Wires



This rope is used where the ordinary single galvanized is not sufficiently strong.

Approx. Diam........inches	¼	9/32	5/16	⅜	7/16	½
Per 100 Feet..............	**$1.70**	**2.05**	**2.50**	**3.25**	**4.30**	**5.25**
Strength...........pounds	3150	4250	5350	6950	9350	12100
Approx. Weight per 1000 Feet.............pounds	121	164	205	273	399	517

Morse-Starrett Cable Bands



A perfect serving for cable to confine loose strands at end.

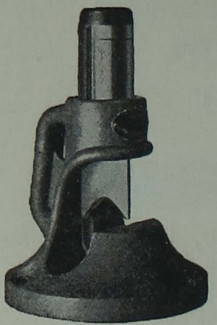
This cable band is a sheet of pliable but very tough steel indented with a groove and lock seam at one edge, galvanized. Made in lengths and sizes to fit cable up to 1½-inch diameter.

Applied in 20 seconds with a pair of ordinary pliers.

Packed in boxes of 50 of each size.

STARRETT CABLE BAND
PAT. NO 1698830
ALAMEDA, CALIF.
¾"
STARRETT CABLE BAND
PAT. NO 1698830
ALAMEDA, CALIF.

For Rope Sizes.	3/16 to 7/16	½ to 11/16	¾ to 1	1⅛ to 1½
Per 100.........	**$2.00**	**2.50**	**3.00**	**4.50**
Per 1000.......	**15.00**	**20.00**	**25.00**	**40.00**



Morse-Starrett Cable Cutters

Hammer Type

Designed to cut cable with the minimum of effort and danger. Patented blade and die prevents flattening of the cable and displacing the lay of the strands. Cuts the finest wire cleanly.

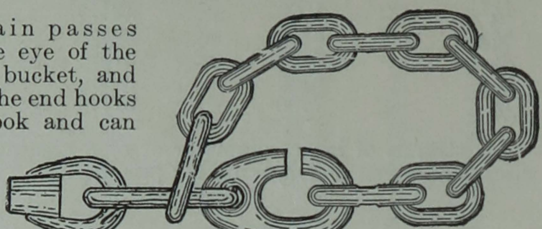
The cutting edge of the blade in the hammer type is self-forming and self-hardening under use.

No. 1 is a light kit model.
No. 1-A, heavy duty portable.
No. 2 extra heavy duty portable.

Number	1	1-A	2
Each	$10.00	17.50	27.50
Capacity Cable Up to ... in.	1	1 1/16	1 1/2
Height ... in.	6	7	9
Diameter at Base ... in.	3 1/2	6	7 3/4
Shipping Weight ... lbs.	8	20	37

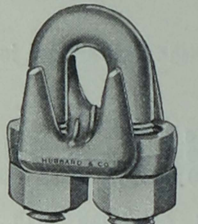
Safety Hook and Chain

The chain passes through the eye of the bail of the bucket, and the link in the end hooks into the hook and can only be unfastened by turning crosswise to the hook at a certain place. Can be furnished with or without rope socket.



Diam. of Rope... inches	3/8	1/2	5/8	3/4	7/8
Capacity ... pounds	4000	7000	10000	12000	15000
Price, without Rope Socket ... each	$4.25	5.25	6.00	7.00	8.50

Hubbard Drop Forged Wire Rope Clips



Made of high grade forging steel. Clean, smooth threads and finish.

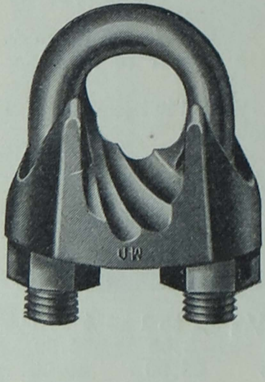
Hot galvanized under the double-dip hot galvanized process.

U bolts equipped with U.S.S. semi-finished nuts.

No.	Per 100 Pieces	Size Strand Inches	Wt., Lbs. per 100 Pieces	No.	Per 100 Pieces	Size Strand Inches	Wt., Lbs. per 100 Pieces
7480	$35.00	1/4	30	7487	$75.00	7/8	245
7481	35.00	5/16	30	7488	85.00	1	260
7482	40.00	3/8	34	7489	95.00	1 1/8	305
7483	45.00	7/16	70	7490	110.00	1 1/4	440
7484	45.00	1/2	70	7491	125.00	1 3/8	455
7485	55.00	5/8	100	7492	150.00	1 1/2	635
7486	65.00	3/4	150	....	......	...	...

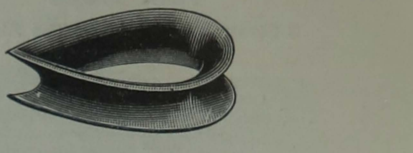
U-W Wire Rope Clips

Base is malleable iron. U-Bolt is steel.



Size Inches	Per 100 Japanned	Per 100 Galvanized
3/16	$6.50	$8.00
1/4	6.50	8.00
5/16	7.00	9.00
3/8	9.70	12.00
7/16	12.50	15.50
1/2	14.50	18.50
9/16	19.00	24.50
5/8	19.00	24.50
3/4	27.00	35.00
7/8	38.50	50.00
1	46.50	60.00
1 1/8	75.00	95.00
1 1/4	90.00	112.00
1 3/8	105.00	130.00
1 1/2	120.00	150.00
1 3/4	310.00	415.00
2	415.00	550.00

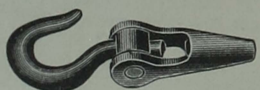
No. 29 Galvanized Wire Rope Thimbles



Diam. Rope In.	Per 100	Approx. Wt., Lbs. per 100	Diam. Rope In.	Per 100	Approx. Wt., Lbs. per 100
3/16	$4.40	3	7/8	$16.00	60
1/4	4.40	4	1	21.00	80
5/16	5.25	5	1 1/8	38.00	120
3/8	6.00	9	1 1/4	44.00	160
7/16	7.00	11	1 1/2	120.00	270
1/2	8.00	15	1 3/4	160.00	300
5/8	11.00	35	2	200.00	570
3/4	13.00	50	...	......	...

Prices for larger sizes upon application.

No. S-425 Drop-Forged Steel Dirigo Double Swivel Hook Sockets

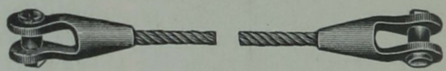


Diameter Rope Inches	Hook, Inches For Cruc. Steel	Hook, Inches For Plow Steel	Diameter Rope Inches	Hook, Inches For Cruc. Steel	Hook, Inches For Plow Steel
1/4	2	3	3/4	9	11
5/16	3	4	7/8	11	12
3/8	4	5	1	12	13
7/16	5	6	1 1/8	13	14
1/2	6	7	1 1/4	14	15
9/16	7	8	1 3/8	15	15 1/2
5/8	8	9	1 1/2	15 1/2	16

Prices upon application.

Open Wire Rope Sockets

Drop Forged Steel

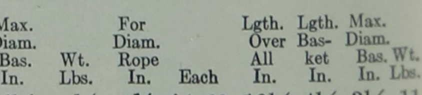


*Diam. Rope In.	Opening Between Jaws, In.	Diam. Pin In.	Price Each	*Diam. Rope In.	Opening Between Jaws, In.	Diam. Pin In.	Price Each
1/4	5/8	1/2	$1.00	1 1/8	1 7/8	1 3/4	$5.75
5/16	5/8	1/2	1.05	1 1/4	2 1/16	1 7/8	9.25
3/8	13/16	5/8	1.40	1 3/8	2 1/16	2	9.75
7/16	13/16	5/8	1.45	1 1/2	2 1/2	2 1/4	13.00
1/2	15/16	7/8	1.85	1 5/8	2 1/2	2 1/2	14.50
9/16	15/16	7/8	1.95	1 3/4	3	2 3/4	34.00
5/8	1 1/8	1	2.40	1 7/8	3	3	37.00
3/4	1 5/16	1 1/8	3.10	2	3 1/2	3 1/4	53.00
7/8	1 5/8	1 1/4	3.90	2 1/4	3 1/2	3 1/2	58.00
1	1 7/8	1 5/8	5.25	...	...	...	.....

*Order by this dimension.

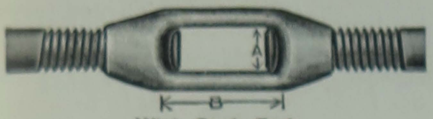
No. S-417 Drop-Forged Steel Closed Pattern Wire Rope Sockets

Made of drop-forged steel, self-colored.

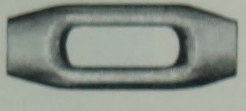


For Diam. Rope In.	Each	Lgth. Over All In.	Lgth. Basket In.	Max. Diam. Bas. In.	Wt. Lbs.	For Diam. Rope In.	Each	Lgth. Over All In.	Lgth. Basket In.	Max. Diam. Bas. In.	Wt. Lbs.
1/4	$.70	3 5/16	1 11/16	1 11/32	1/2	1 1/8	$4.60	10 1/4	4 1/2	3 1/2	11
5/16	.75	3 5/16	1 11/16	1 11/32	1/2	1 1/4	7.00	11 1/4	4 3/4	4	15
3/8	.85	5 1/4	2 1/2	1 11/16	1 1/4	1 3/8	7.50	11 1/4	4 3/4	4	15
7/16	.90	5 1/4	2 1/2	1 11/16	1 1/4	1 1/2	10.50	13	5 7/8	4 3/4	26
1/2	1.15	6 3/16	2 11/16	1 15/16	1 3/4	1 5/8	11.50	13	5 7/8	4 3/4	26
9/16	1.25	6 3/16	2 11/16	1 15/16	1 3/4	1 3/4	25.00	15 1/4	6 5/8	6	48
5/8	1.55	6 3/4	3 1/8	2 5/16	2 3/4	1 7/8	27.00	15 1/4	6 5/8	6	48
3/4	2.10	8	3 1/2	2 5/8	4 5/8	2	37.00	17 3/4	8 1/4	7 1/8	75
7/8	2.90	9	4	3	6 3/4	2 1/4	40.00	17 3/4	8 1/4	7 1/8	75
1	4.00	10 1/4	4 1/2	3 1/2	11	...	.....	....	...	...	..

Turnbuckles with or without Stubs



With Stub Ends

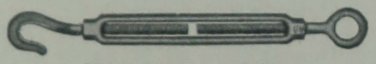


Without Stub Ends

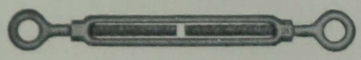
Diam. Screw In.	Each, Inside Opening, Inches: 3	6	9	12	18	24	36	48
¼	$.36	....	....	....	....	....	....	....
5/16	.38	....	....	....	....	....	....	....
⅜	.45	$.45	....	....	....	....	....	....
½	.50	.50	$.75	$.88	....	....	....	....
⅝	.75	.60	.90	1.05	$1.50	....	....	....
¾	.75	.75	1.13	1.31	1.88	$2.63	....	....
⅞	1.10	.90	....	1.58	2.25	3.15	....	....
1	1.10	1.10	....	1.93	2.75	3.85	$4.40	....
1⅛	1.70	1.40	....	2.45	3.50	4.90	5.60	....
1¼	1.70	1.70	....	2.98	4.25	5.95	6.80	....
1⅜	....	2.10	....	....	....	....	....	....
1½	....	2.50	....	4.38	6.25	8.75	10.00	$15.00
1⅝	....	3.25	....	....	....	....	....	....
1¾	....	4.00	....	....	10.00	14.00	16.00	24.00
2	....	6.25	....	....	....	21.88	25.00	37.50
2¼	....	9.25	....	....	....	32.38	37.00	55.50
2½	....	13.00	....	....	....	45.50	52.00	78.00

Sizes heretofore shown can still be had but to order only.

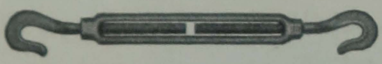
U-W Drop-Forged Steel Weldless Turnbuckles



With Hook and Eye



With Eye and Eye



With Hook and Hook

For erecting contractors, marine trade and oil country trade.

Drop-forged steel body with hexagon shaped heads, fitted with drop-forged weldless eyes or drop-forged reinforced flattened hooks. I. D. of eye is equal to twice diameter of bolt.

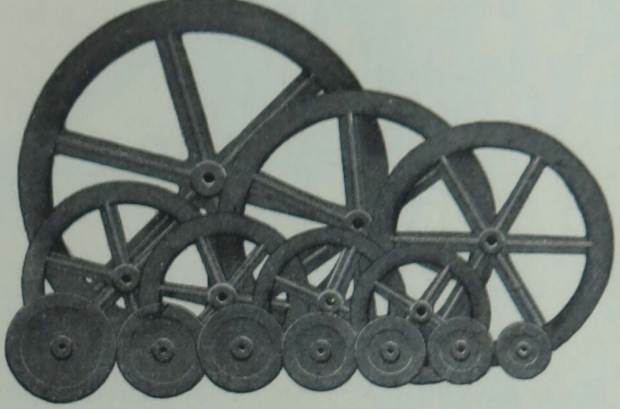
For overall length when extended add length of opening or take-up of buckle to overall length when closed.

Bolt Diam. In.	Opening In.	Each Plain	Each Galv.	Length When Closed In.	Wt. Lbs. per 100
½	9	$1.20	$1.45	17	190
½	12	1.40	1.70	20	320
⅝	9	1.45	1.75	19	320
⅝	12	1.70	2.10	22	395
⅝	18	2.20	2.60	28	500
¾	9	1.90	2.30	20	475
¾	12	2.20	2.70	23	550
¾	18	3.00	3.60	29	750
¾	24	3.50	4.20	35	830
⅞	12	2.80	3.40	25	825
⅞	18	3.60	4.30	31	1075
⅞	24	4.40	5.25	37	1288
1	12	3.50	4.20	28	1095
1	18	4.50	5.50	34	1375
1	24	5.50	6.75	40	1638
1	36	7.00	8.50	52	2150
1⅛	12	4.20	5.25	29	1450
1⅛	18	5.50	6.75	35	1800
1⅛	24	6.75	8.25	41	2049
1⅛	36	8.50	10.50	53	2647
1¼	12	6.00	7.25	31	1807
1¼	18	$7.50	$9.00	37	2150
1¼	24	9.50	11.50	43	2553
1¼	36	13.00	16.00	55	3260
1½	12	9.00	11.00	33	2928
1½	18	11.00	13.50	39	3440
1½	24	14.00	17.00	45	3952
1½	36	18.00	22.00	57	4975
1½	48	23.00	28.00	69	6000
1¾	18	18.00	22.00	41	5400
1¾	24	23.00	28.00	47	6200
1¾	36	30.00	36.00	59	7800
1¾	48	38.00	47.00	71	9400
2	24	35.00	42.00	48	8000
2	36	40.00	50.00	60	10000
2	48	50.00	62.00	72	12100
2¼	24	50.00	60.00	53	13250
2¼	36	55.00	68.00	65	16300
2¼	48	70.00	86.00	77	19300
2½	24	65.00	80.00	58	14000
2½	36	75.00	93.00	70	17500
2½	48	90.00	110.00	82	20500

For one lock nut add 5%; for two lock nuts add 10%.

Card Standard Rope Sheaves

Heavy Pattern



All standard rope sheaves are made from high quality wheel mixture iron, in heavy pattern only. Designed for heavy work under severe conditions.

Unless otherwise specified, sheaves will be furnished as follows for the shaft shown in the table:

4 to 12-inch sheaves with solid or web center and with 1 set screw.

16 to 30-inch sheaves of ribbed spoke pattern and with 2 set screws each.

36-inch sheaves and larger of ribbed spoke pattern and key-seated.

Standard sheaves 16 inches and larger can be made with a web center, if necessary, and where the rope pull or services requires it. Prices on application.

Prices for sheaves with special bores, special hubs, or with keyways other than specified, furnished on receipt of specifications.

All sizes of standard plain groove sheaves are carried in stock for immediate shipment.

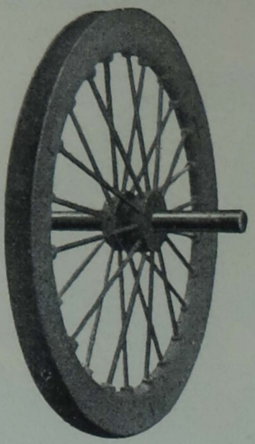
Turned groove sheaves are made on order. Specify the rope diameter to be used so that the groove can be turned properly to support the rope.

Sheave Size In.	Plain Groove Sheave Only Each	Plain Groove Sheave Shaft & Boxes Each	Add for Turned Groove	*Groove Diam. In.	O.D. In.	Max. Rope Diam. In.	Shaft Size In.	Wt., Lbs. Plain Groove **Sheave Only	Wt., Lbs. Plain Groove Sheave Shaft & Boxes
4	$1.27	.....	$.52	4	6	⅞	¾	6	...
5	1.35	.....	.54	5	7¼	⅞	¾	8	...
6	1.62	.....	.62	6	8½	1	1	15	...
7	2.02	.....	.68	7	9½	1	1	16	...
8	2.20	.....	.73	8	10½	1	1	18	...
9	2.30	.....	.79	9	11⅝	1	1	20	...
With Solid Cast Iron Journal Box									
10	$2.47	$4.74	$.92	10	12¾	1	1 3/16 x 8½	24	36
12	3.86	6.61	1.17	12	14¾	1	1 7/16 x10½	30	49
16	4.86	7.80	1.46	16	18⅞	1	1 7/16 x11	43	62
18	6.21	9.47	1.75	18	21	1⅛	1 11/16x11½	56	80
20	8.35	11.66	2.03	19¼	23¾	1⅛	1 11/16x12	76	101
24	11.20	15.12	2.41	23¼	27¾	1¼	1 15/16x13½	110	144
30	16.93	21.53	2.91	29	34	1¼	2 3/16 x15	158	201
36	21.52	27.71	3.45	35¼	40	1¼	2 7/16 x16½	217	278
With Ring Oiling Journal Box									
48	$39.42	$69.39	$8.64	47	52¾	1¼	2 15/16x24	460	655

*Groove diameter of turned groove sheaves is ¼ inch larger than list.

**Turned groove sheaves are approximately 10 per cent heavier than list.

Bicycle Spoke Sheaves



Bicycle spoke sheaves are used on head frames for hoisting from shafts or as bull wheels where there is exceptional strain on the sheave.

Bicycle spoke sheaves are made only from a heavy pattern and will withstand the heaviest service.

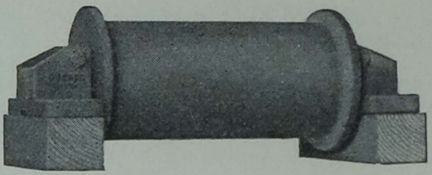
The grooves are all turned with a liberal depth of rim, insuring strength and stiffness, together with long life.

Bearings are of heavy ring-oiling type.

Always state the diameter of the sheave, the diameter of the shaft, and the size of rope for which the sheave is desired.

Sheave Diam. In.	Without Shaft and Boxes Each	Without Shaft and Boxes Wt. Lbs.	With Shaft and Boxes Each	With Shaft and Boxes Wt. Lbs.	O.D. Shaft In.	Diam. of Shaft at Bearings Inches	Length, In. Shaft	Length, In. Hub
48	**$83.18**	580	**$162.20**	1040	52¾	3 15/16	38½	7½
54	**116.75**	1032	**206.25**	1600	64	4 7/16	41	8
60	**125.26**	1212	**214.72**	1780	70	4 7/16	41	8
72	**156.43**	1533	**258.32**	2270	82	4 15/16	47	10
84	**195.33**	2050	**298.55**	2800	96	4 15/16	49	12
96	**239.88**	2650	**355.06**	3250	108	5 7/16	51	14
108	**281.93**	3120	**410.55**	4120	120	5 15/16	53	16

No. 65-14 MST Card Roller Bearing Slope Rollers



An easy running, grease lubricated, roller bearing slope or track roller designed especially for heavy duty, large ropes and high speeds.

The roller, shaft and roller bearings are a self-contained unit, and will not bind when set in the boxes. Easily disassembled when necessary.

Both roller shell and ends are machined and balanced before assembly. The manganese steel shell is ½ inch thick.

The high carbon steel shaft is not weakened by oil holes or other machining.

Equipped with standard Timken Bearings. Grease lubricated through standard grease fittings direct to the bearings and an ample grease chamber. Seal keeps dirt out and grease in. Runs at least 3 months on one lubrication.

Shipment from stock, grease packed, ready for installing.

Roller diameter, 6½ inches; flange diameter, 8 inches; roller length, 14 inches; length over all, 20¾ inches.

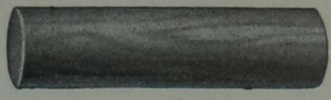
Weight each, 81 pounds.

No. **65-14**, with D Box....................... each **$26.50**

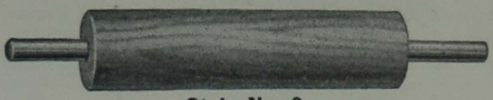
Splicing Wire Rope

We will be glad to furnish complete detailed illustrated instructions for splicing wire rope, or to give personal instructions in this art under the direction of a skilled rope splicer.

Card Oak Rollers



Style No. 1



Style No. 2

Turned from No. 1 Car Oak.

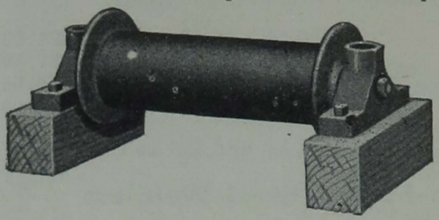
Furnished plain or with shaft running through and extending 3 inches on each end. Cast iron journal boxes can be furnished when specified.

Rollers are furnished in standard 12-inch lengths unless otherwise specified.

	Style No. 1			Style No. 2		
Approx. O.D. .... in.	**3**	**4**	**6**	**3**	**4**	**6**
Each	**$.53**	**$.70**	**$1.32**	**$.92**	**$1.10**	**$1.93**
Differential from Standard .... per in.	**.05**	**.07**	**.12**	**.08**	**.10**	**.17**
Shaft Diameter .... in.	...	...	...	¾	¾	1
Weight .... lbs.	3	5	12	5	7	16

Boxes for Style No. **2**, Weight per pair, 10 Lbs.. per pair **$1.66**

Card Pipe Track Rope Rollers

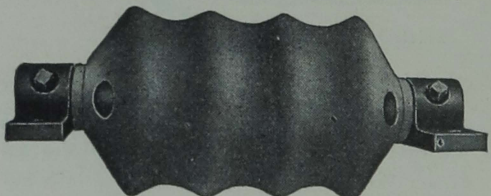


Made with chilled iron bearings; renewable pipe filling. Capacious oil reservoir in each box.

Standard length filling, 14 inches. Any length can be furnished. Can also be furnished with oak filler of any length and up to and including 5½-inch diameter.

No	P-35	P-40	P-45	P-55	P-65
Complete, with Boxes.. each	**$3.11**	**$3.49**	**$3.91**	**$4.72**	**$5.49**
Roller, without Boxes.. each	**2.07**	**2.45**	**2.87**	**3.68**	**4.43**
Journal Boxes ...... per pair	**1.14**	**1.14**	**1.14**	**1.14**	**1.14**
Roller End Castings. per pair	**.63**	**.67**	**.81**	**1.02**	**1.18**
Differential from Standard Filling .... per inch	**.08**	**.10**	**.12**	**.15**	**.19**
Complete Weight .... lbs.	31	34	37	43	50

Card Chilled Groove Slope Rollers

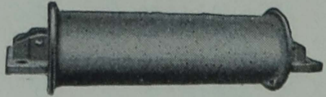


For heavy duty service.

Roller turns on shaft held stationary in boxes. Chilled iron grooves.

No. of Grooves	2	3	4
Complete, Plain Bearing .... each	**$5.12**	**$5.69**	**$6.22**
Roller Only, Plain Bearing .... each	**3.93**	**4.48**	**5.01**
Complete, Graphite Bronze Bushed. each	**7.19**	**7.76**	**8.29**
Roller Only, Graphite Bronze Bushed. ea.	**6.22**	**6.77**	**7.29**
Complete Weight .... lbs.	41	50	59

Card Roller Bearing Track Rope Rollers

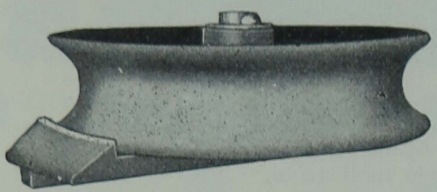


Special analysis steel tube. Tapered roller bearings. Grease lubricated roller. Special steel shaft. Standard length filler, 14 inches. Cast iron bearing boxes. Style D boxes are regularly furnished. Style E boxes, with rope guard, are furnished only when specified.

No	45PT	55PT	66PT
Complete with Style D Boxes ..... each	**$7.00**	**$8.75**	**$11.75**
Complete with Style E Boxes...... each	**7.52**	**9.31**	**12.40**
Roller Only, without Bearings..... each	**5.32**	**6.87**	**8.25**
Shaft Only .... each	**.46**	**.46**	**.75**
Style D Boxes .... per pair	**.56**	**.56**	**.70**
Style E Boxes .... per pair	**1.12**	**1.16**	**1.40**
Extra over Standard Length... per inch	**.18**	**.23**	**.30**
Roller Diameter .... in.	4½	5 9/16	6⅝
Flange Diameter .... in.	5½	6 11/16	7⅞
Flange Height .... in.	3⅝	4¼	5
Style D Box Height .... in.	1⅞	1⅞	2¼
Style E Box Height .... in.	4	4⅝	5⅜
Approx. Complete Weight .... lbs.	27	36	46

Card Style B Curve Sheaves

Plain Bearing



Designed for use on curves or pulling out of entries and is usually set outside the track. The groove of the sheave is chilled to minimize wear.

Sheaves fitted with graphite filled self-lubricating bronze bushings on order only. Prices on application.

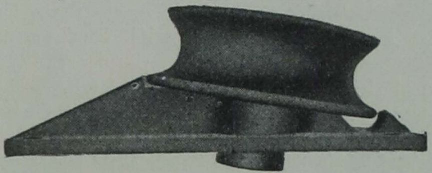
No.	118-B	119-B	123-B	127-B	131-B
Complete.........each	**$5.65**	**$6.20**	**$9.26**	**$14.97**	**$20.26**
Sheave Only......each	**3.35**	**3.91**	**6.35**	**10.97**	**15.52**
Base and Shaft....each	**2.54**	**2.59**	**3.50**	**5.16**	**6.43**
O.D...............in.	10½	10½	15	21	27
Width of Face......in.	4½	5½	5	5	5
Complete Weight..lbs.	47	56	91	158	211

Tapered Roller Bearing

An improved horizontal type curve sheave with bearings so designed that both thrust and radial loads are equally taken care of. Grease lubricated direct to an ample grease chamber; dirt-proof. Regularly equipped with a standard fitting for grease lubrication. Cap is so designed that the rope cannot catch, should it miss the face. Face of sheave is chilled iron to minimize rope wear.

No.	361	372	384	397
Complete...............each	**$11.50**	**$15.51**	**$21.45**	**$26.78**
Sheave Only, without Bearings...............each	**4.54**	**7.03**	**11.63**	**16.23**
Base and Shaft,.........each	**3.30**	**4.23**	**5.92**	**7.18**
Groove Diameter..........in.	8½	12	18	24
O.D.....................in.	10½	15	21	27
Width of Face............in.	5½	5	5	5
Height...................in.	7	7¼	7¾	7¾
Complete Weight.........lbs.	65	98	167	220

Card Special Angle Curve Sheaves



The sheave has a web center, reinforced by ribs; rope wear on the groove is minimized by the chilled face. Sheave may be set inside the rails on the wider gages.

Plain Bearing

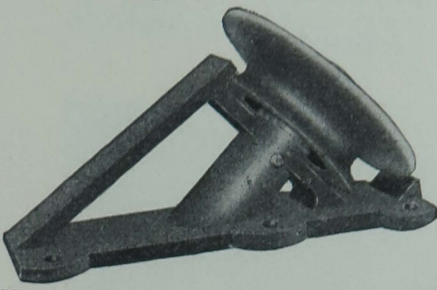
No.	1407	1117
Complete..............................each	**$5.96**	**$7.65**
Sheave Only, without Bearings........each	**2.13**	**3.11**
Base and Shaft.........................each	**4.16**	**4.95**
O.D...................................in.	9	12
Groove Diameter.......................in.	7¼	9
Width of Face..........................in.	3	4
Angle....................................	17°	10°
Overall Height.........................in.	6⅝	7½
Overall Length.........................in.	15	20
Complete Weight.......................lbs.	54	87

Roller Bearing

The roller bearing sheave is grease lubricated through a large reservoir direct to the bearings, and regularly furnished with a standard grease fitting. The caps have guards that prevent the rope from catching on it or the shaft. Shaft is of special analysis axle steel.

No.	17–7	10–9
Complete..............................each	**$11.60**	**$14.16**
Sheave Only, without Bearings........each	**3.02**	**4.05**
Base and Shaft.........................each	**4.92**	**5.73**
O.D...................................in.	9	12
Groove Diameter.......................in.	7¼	9
Width of Face..........................in.	3	4
Angle....................................	17°	10°
Overall Height.........................in.	6⅝	7½
Overall Length.........................in.	15	20
Complete Weight.......................lbs.	60	93

Style A Card Curve Sheaves

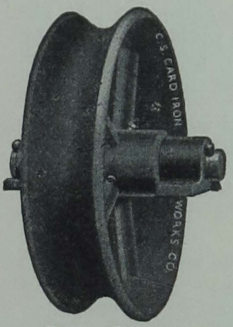


Commonly called 45° sheave. When set inside the track, it will be found useful on curves or in pulling out of entries. The groove of the wheel is chilled to minimize wear.

No.	295-A	200-A	281-A
Curve Sheave Complete........each	**$3.60**	**$4.12**	**$7.67**
Sheave Only.....................each	**1.18**	**1.54**	**2.77**
Base and Shaft..................each	**2.60**	**2.79**	**5.33**
O. D.............................in.	8	9½	12
Groove Diameter.................in.	4¾	5½	6½
Complete Weight................lbs.	38	51	100

Card Concave Chilled Face Knuckle Sheaves

Plain Bearing



Roller Bearing

Designed especially for use on knuckles. Set-screwed to the shaft which runs in solid cast iron journal boxes. Face is chilled and prevents the rope from rapidly cutting the sheave. Furnished complete with sheave, shaft and boxes.

No.	Complete Each	*Sheave Only Each	O.D. In.	Hub Length In.	Shaft Diam. In.	Compl. Wt. Lbs.
118	**$6.04**	**$3.88**	10½	5	1 7/16	49
119	**6.56**	**4.38**	10½	6	1 7/16	59
121	**8.39**	**6.47**	15	4½	1 7/16	74
123	**10.06**	**6.99**	15	5½	1 15/16	95
127	**14.96**	**11.76**	21	5½	2 3/16	143
131	**19.10**	**16.32**	27	5½	2 3/16	183

*Bored and set-screwed.

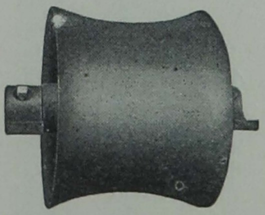
Roller Bearing

Sheave is regularly equipped with a standard grease fitting, the grease being forced direct to the bearings.

No.	242	254	266
Sheave, Shaft and Boxes, Complete..........................each	**$11.68**	**$15.81**	**$19.95**
Sheave Only, with Grease Hole..each	**7.18**	**11.74**	**16.30**
O. D..............................in.	15	21	27
Groove Diameter..................in.	12	18	24
Shaft Size.........................in.	2 3/16	2 3/16	2 3/16
Complete Weight..................lbs.	104	144	184

Card Concave Chilled Face Slope Rollers

Plain Bearing



This roller is for use on slope, and runs loose on the shaft which is set-screwed in the solid cast iron boxes. Boxes are usually fastened to cross pieces running from tie to tie. Rollers are made with a chilled face, minimizing rope wear.

No.	65	69	107	111	115	117
Complete........each	**$3.78**	**$4.52**	**$5.40**	**$6.69**	**$8.66**	**$9.43**
Roller Only......each	**2.36**	**3.13**	**4.03**	**5.38**	**7.55**	**8.33**
O. D..............in.	5	6	8	9	12	11½
Hub Length.......in.	4⅜	6½	6⅜	9½	9½	12
Shaft Diameter....in.	¾	1	1¼	1¼	1¼	1¼
Complete Weight.lbs.	21	26	37	48	83	82

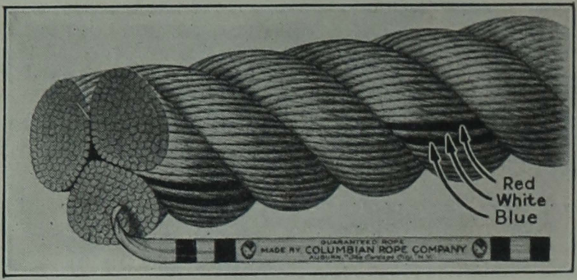
Tapered Roller Bearing

Made for heavy duty and easy running. Boxes have a rope guard to prevent the rope laying on top and sawing.

No.	311	315
Complete..............................each	**$12.48**	**$13.36**
Roller Only, without Bearings..........each	**6.33**	**7.21**
Shaft with 1 Washer....................each	**1.40**	**1.40**
Boxes............................per pair	**2.93**	**3.00**
O.D...................................in.	9	11
Diameter at Center.....................in.	7¼	9¼
Height.................................in.	6	7
Complete Weight.......................lbs.	69	86

Columbian Tape-Marked Manila Rope

3-Strand



The Columbian Tape-Marker, which contains the Columbian Guarantee, is now augmented in all Tape-Marked Rope ¾ inch and larger in diameter, by red, white and blue surface markers. Thus Columbian Tape-Marked Rope is tangibly guaranteed and readily identified.

Columbian Tape-Marked Rope is water-proofed. It absorbs less water under every test. It is sealed against the action of the elements and against the germs of decay. Durable and strong, Columbian rope is flexible wet or dry.

A good rule for determining the actual working capacity of a rope is to consider it as ⅕ of the breaking strength.

When ordering rope always state whether the sizes refer to diameter or circumference.

Diam. Inches	Circumference Inches	Approx. Gross Weight, Pounds: Full Coil 1200 Feet	Approx. Gross Weight, Pounds: Per Foot	Length in One Pound: Feet	Length in One Pound: Inches	Strength in Pounds: Breaking	Strength in Pounds: Working
3/16	⅝	*(40)18	.015	66	7	450	90
¼	¾	*(40)24	.020	50	.	600	120
5/16	1	*(55)35	.029	34	6	1000	200
⅜	1⅛	*(65)49	.041	24	5	1350	230
7/16	1¼	*(80)63	.0525	19	.	1750	330
15/32	1⅜	*(80)75	.0625	16	.	2250	450
½	1½	90	.075	13	4	2650	530
9/16	1¾	125	.104	9	7	3450	690
⅝	2	160	.133	7	6	4400	880
¾	2¼	200	.167	6	.	5400	1080
13/16	2½	234	.195	5	2	6500	1300
⅞	2¾	270	.225	4	5	7700	1540
1	3	324	.270	3	9	9000	1800
1 1/16	3¼	375	.313	3	2	10500	2100
1⅛	3½	432	.360	2	9	12000	2400
1¼	3¾	502	.418	2	5	13500	2700
1 5/16	4	576	.480	2	1	15000	3000
1½	4½	720	.600	1	8	18500	3700
1⅝	5	893	.744	1	4	22500	4500
1¾	5½	1073	.895	1	1	26500	5300
2	6	1290	1.08	.	11	31000	6200
2⅛	6½	1503	1.25	.	9½	36000	7200
2¼	7	1752	1.46	.	8	41000	8200
2½	7½	2004	1.67	.	7	46500	9300
2⅝	8	2290	1.91	.	6¼	52000	10400
2⅞	8½	2580	2.15	.	5⅝	58000	11600
3	9	2900	2.42	.	5	64000	12800
3⅛	9½	3225	2.69	.	4½	71000	14200
3¼	10	3590	2.99	.	4	77000	15400
3½	11	4400	3.67	.	3¼	91000	18200
3¾	12	5225	4.36	.	2¾	105000	21000

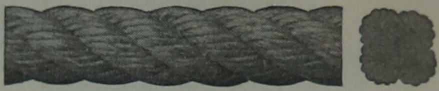
*The six smallest sizes are manufactured to weights approximately the same as the figures in parentheses above because they make more convenient coils for handling.

Four-strand rope weighs about 5 per cent more than 3-strand. Tensile strength approximately the same as 3-strand.

Four-strand rope can be made with either a center core or without. Specify which is wanted when ordering 4-strand rope.

Prices Upon Application

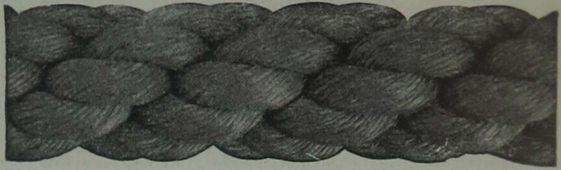
Linemen's Special Manila Rope



A high grade, long fibre, pure manila, four-strand rope with graphite lubricated core and center yarn. Stocked in ⅜, ½, and ¾-inch sizes.

Prices upon application.

Hawser Laid Drilling Cable



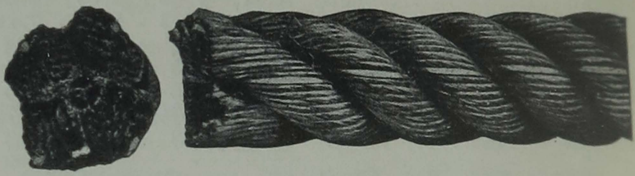
Made from carefully chosen fibre, graded for toughness and general wearing qualities. Every care is taken in the manufacture of cable as to spinning the yarns, the lay of the strand, lubrication, etc., in order to get maximum strength and wearing qualities.

Drilling cable is made three ropes laid into one, or nine strands, so formed as to be throughly uniform. The three ropes are twisted together in the opposite direction to the twist of the ropes, and is usually left hand.

Sizes range from 1¼ to 2½-inch diameter.

Prices upon application.

Manila Transmission Rope

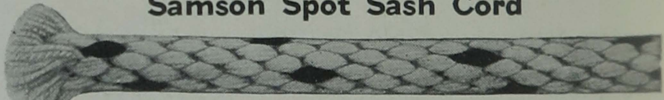


This manila transmission rope is made from the best selected manila hemp. It is made with four strands, unless otherwise ordered.

The yarns of this rope are each coated with a special composition, so that when twisted into strands the coating lodges among the fibres, and thoroughly lubricates the strands and individual fibres composing the rope, thus making it as near waterproof as possible.

Prices upon application.

Samson Spot Sash Cord



Trade Mark Reg. U. S. Patent Office

Made of extra quality stock carefully inspected and warranted free from imperfections of braid or finish. The colored spots are a trade mark used only with this cord. Guaranteed to give satisfactory service when used with pulleys and weights recommended.

Size, No.	Per Pound	Diam. Inches	Feet per Pound	Min. Diam. Pulley Inches	Suitable for Weight Pounds
6	....	3/16	66	1½	Less than 10
7	....	7/32	55	1¾	10 to 15
8	....	¼	44	2	15 to 25
9	....	9/32	36	2¼	25 to 35
10	....	5/16	27	2½	35 to 45
12	....	⅜	20	3	45 to 60

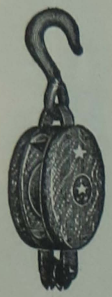
ACID RESISTING MANILA ROPE

The Columbia Rope Company can furnish their first quality manila rope treated with an acid resisting compound.

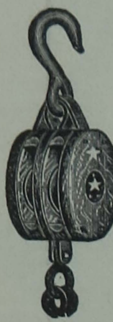
This treated rope is particularly recommended for use around mines and mills where acid waters are present.

Regular Wood Shell Tackle Blocks for Manila Rope

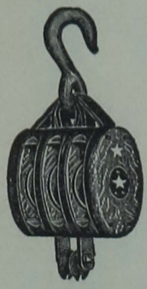
Star Graphite or Iron Bushed
Inside Iron Strapped, Iron Sheaves, Loose Hooks



Single



Double



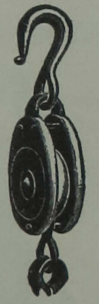
Triple

Beckets are furnished on all single, one-half of the double and one-third of the triple blocks, without charge.

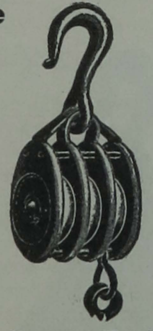
Dimensions, Inches			Price, Each		
Sheaves	Rope	Shell	Single	Double	Triple
1¾x ½x⅜	⅜	3	$.70	$1.30	$1.75
2 x ½x⅜	⅜	3½	.75	1.45	2.00
2¼x ⅝x⅜	½	4	.85	1.60	2.15
3 x ¾x⅜	⅝	5	.90	1.75	2.25
3½x1 x½	⅝–¾	6	1.10	2.00	2.90
4¼x1 x½	⅞	7	1.30	2.40	3.50
4¾x1⅛x⅝	1	8	1.65	2.85	4.25
5½x1⅛x⅝	1	9	1.85	3.40	4.75
6¼x1¼x⅝	1⅛	10	2.75	4.50	6.25
7¼x1¼x¾	1⅛	11	4.45	7.50	10.65
8 x1⅜x¾	1¼	12	4.45	7.50	10.65
9 x1½x¾	1¼	13	7.00	10.50	15.00
9½x1⅝x⅞	1⅜	14	7.00	10.50	15.00

Star Brand Hollow Steel Tackle Blocks for Manila Rope

Loose Hooks



No. 2319 Single



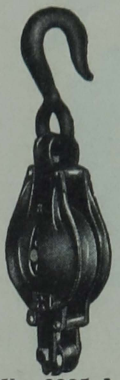
No. 2321 Triple

Dimensions, Inches			Price, Each					
			Star Graphite Bushed			Roller Bushed		
Length Shell	For Dia. Rope	Diam. Sheaves	Single	Double	Triple	Single	Double	Triple
3	⅜	1¾	$.85	$1.65	$2.35	$1.20	$2.35	$3.35
4	½	2¼	.90	1.75	2.50	1.25	2.45	3.50
5	⅝	3	1.00	1.90	2.75	1.35	2.60	3.65
6	⅝–¾	3½	1.25	2.25	3.25	1.65	3.05	4.25
7	⅞	4¼	1.50	2.70	4.00	1.90	3.50	4.70
8	1	4¾	1.85	3.20	4.75	2.45	4.40	6.20
9	1	5½	2.40	4.00	5.50	3.00	5.20	7.00
10	1⅛	6¼	3.10	5.10	7.00	3.85	6.60	8.85
12	1¼	8	5.00	8.25	11.75	5.85	9.95	14.30
14	1⅜	9½	7.50	11.75	16.50	8.75	14.25	20.25

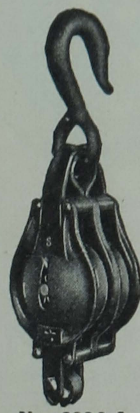
Dimensions, Inches			Price, Each		
			Metaline Bushed		
Lgth. Shell	For Diam. Rope	Diam. Sheaves	Single	Double	Triple
3	⅜	1¾	$1.60	$3.15	$4.60
4	½	2¼	1.65	3.25	4.75
5	⅝	3	1.80	3.50	5.15
6	⅝–¾	3½	2.10	4.00	5.80
7	⅞	4¼	2.45	4.60	6.85
8	1	4¾	2.90	5.30	7.90
9	1	5½	3.55	6.30	9.00
10	1⅛	6¼	4.40	7.70	11.00
12	1¼	8	6.45	11.15	16.00
14	1⅜	9½	9.10	15.00	21.30

B & L Star Brand Metal Blocks for Manila Rope

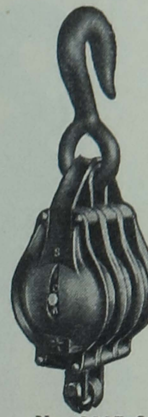
Malleable Iron Shells—Loose Side Hooks and Beckets



No. 2325-A
Single



No. 2326-A
Double



No. 2327-A
Triple

Hooks are drop-forged of special steel and of extra large size and strength. The shell is certified malleable iron—carefully rounded and without sharp projection and constructed to prevent rope jamming between the shell and sheaves.

Double blocks of all sizes have full center straps, and all straps extend through the entire length of the block so all becket strain is borne by the straps not the shell.

Pin ends are entirely covered by recess in sides of the shell, allowing the block to be used on the ground or to pass any protruding object, when raising or lowering without interference.

Sheaves are of standard tackle block dimensions, and can be supplied japanned or galvanized, with any style bushing.

Blocks can be supplied promptly in all sizes. Supplied with any connection, including safety link.

Sheaves in 8-inch blocks and smaller are same sizes as in regular mortise wood blocks. Sheaves in 9-inch blocks and larger are same sizes as in wide mortise wood blocks.

Iron Bushed

Dimensions, Inches			All Japanned Each			All Galvanized Each		
Size Sheaves	Diam. Rope	Length Shell	Single	Double	Triple	Single	Double	Triple
1¾x ½x⅜	⅜	3	$1.10	$1.60	$2.10	$1.20	$1.75	$2.30
2 x ⅝x⅜	½	3½	1.20	1.75	2.35	1.30	1.95	2.60
2¼x ⅝x⅜	½	4	1.30	1.85	2.60	1.45	2.05	2.90
3 x ¾x⅜	⅝	5	1.65	2.50	3.30	1.90	2.85	3.85
3½x1 x½	¾	6	2.00	3.10	4.20	2.35	3.65	5.00
4¼x1 x½	⅞	7	2.65	4.10	6.00	3.15	4.85	7.20
4¾x1⅛x⅝	1	8	3.25	5.40	7.40	4.00	6.70	9.15
5½x1⅜x⅝	1⅛	9	4.60	7.30	10.00	5.65	9.00	12.25
6¼x1½x¾	1¼	10	5.50	9.00	12.00	6.80	11.10	14.90
8 x1⅝x¾	1⅜	12	8.40	13.70	19.80	10.50	17.00	24.20
9½x1⅞x⅞	1½	14	15.50	28.00	38.50	18.50	32.60	44.90

Patent 6-Roller Bushed

Size Sheaves	Diam. Rope	Length Shell	Single	Double	Triple	Single	Double	Triple
1¾x ½x⅜	⅜	3	$1.30	$2.10	$2.60	$1.40	$2.25	$2.80
2 x ⅝x⅜	½	3½	1.40	2.35	3.00	1.50	2.55	3.25
2¼x ⅝x⅜	½	4	1.50	2.50	3.40	1.65	2.70	3.70
3 x ¾x⅜	⅝	5	2.00	3.10	4.35	2.25	3.45	4.90
3½x1 x½	¾	6	2.40	3.90	5.40	2.75	4.45	6.20
4¼x1 x½	⅞	7	3.05	4.90	6.85	3.55	5.65	8.05
4¾x1⅛x⅝	1	8	3.85	6.60	9.20	4.60	7.90	10.95
5½x1⅜x⅝	1⅛	9	5.25	8.95	11.80	6.30	10.65	14.05
6¼x1½x¾	1¼	10	7.00	10.90	14.85	8.30	13.00	17.75
8 x1⅝x¾	1⅜	12	10.20	17.50	25.00	12.30	20.80	29.40
9½x1⅞x⅞	1½	14	17.50	30.00	41.50	20.50	34.60	47.90

Graphite-Bronze Bushed

Self-Lubricating

Size Sheaves	Diam. Rope	Length Shell	Single	Double	Triple	Single	Double	Triple
1¾x ½x⅜	⅜	3	$1.60	$2.65	$3.40	$1.70	$2.80	$3.60
2 x ⅝x⅜	½	3½	1.70	2.90	3.85	1.80	3.10	4.10
2¼x ⅝x⅜	½	4	1.80	3.15	4.25	1.95	3.35	4.55
3 x ¾x⅜	⅝	5	2.35	3.80	5.40	2.60	4.15	5.95
3½x1 x½	¾	6	3.10	5.25	7.20	3.45	5.80	8.00
4¼x1 x½	⅞	7	3.60	5.90	8.40	4.10	6.65	9.60
4¾x1⅛x⅝	1	8	4.55	7.65	10.70	5.30	8.95	12.45
5½x1⅜x⅝	1⅛	9	5.90	10.30	13.85	6.95	12.00	16.10
6¼x1½x¾	1¼	10	7.75	12.85	17.55	9.05	14.95	20.45
8 x1⅝x¾	1⅜	12	11.00	19.00	27.20	13.10	22.30	31.60
9½x1⅞x⅞	1½	14	18.00	31.00	43.00	21.00	35.60	49.40

No. 2359 Tarbox Malleable Iron Shell Snatch Blocks for Manila Rope

Front View

Rear View

A self-locking snatch block recommended to all users of manila rope snatch blocks.

The link automatically engages the head and the block cannot come open while in use.

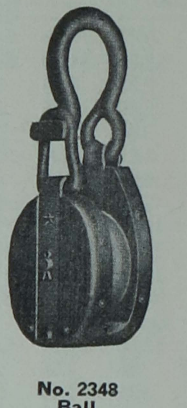
The shells are malleable iron and the head and link are drop forged.

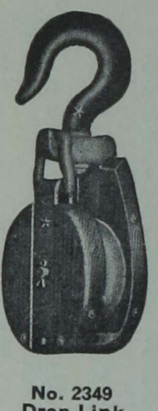
Furnished with sheaves for wire rope, if desired.

Dimensions, Inches			Price, Each		
Size of Sheaves	Diam. of Rope	Length of Shell	*Star Graphite Bushed	Five-roller Bushed	*Star Metaline or Graphite, Bronze Bushed
3 x1⅛x ½	⅞	6	$4.50	$5.15	$5.75
3½x1¼x ½	⅞	7	5.50	6.25	6.75
4½x1⅜x ⅝	1	8	6.50	7.35	8.00
5 x1⅜x ⅝	1⅛	9	7.50	8.50	9.25
5¾x1⅞x ¾	1¼	10	10.00	11.50	12.50
6¾x2⅛x ¾	1½	12	12.50	14.00	15.50
8 x2¼x ⅞	1¾	14	16.00	18.00	19.50
9 x2⅝x1	2	16	21.00	24.00	26.00

*Self-lubricating.

Wood Shell Snatch Blocks for Manila Rope


No. 2348
Ball

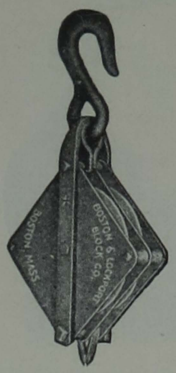

No. 2349
Drop Link

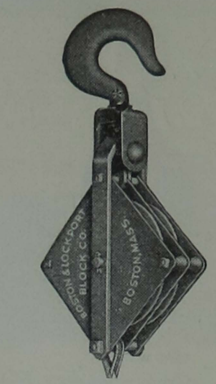
Drop forged flatted hooks, heads and links.

Size Sheave Inches	Diameter Rope Inches	Length Shell Inches	Iron Bushed Each	Star Graphite Bushed Self-Lubricating Each	Patent Six-Roller Bushed Each	Graphite-Bronze Bushed Self-Lubricating Each
3 x1⅛x ½	⅞	6	$4.00	$4.00	$4.65	$5.25
3½x1¼x ½	⅞	7	4.75	4.75	5.50	6.00
4½x1⅜x ⅝	1	8	5.75	5.75	6.60	7.25
5 x1⅜x ⅝	1⅛	9	6.75	6.75	7.75	8.50
5¾x1⅞x ¾	1¼	10	8.50	8.50	10.00	11.00
6¾x2⅛x ¾	1½	12	10.00	10.00	11.50	13.00
8 x2¼x ⅞	1¾	14	13.00	13.00	15.00	16.50
9 x2⅝x1	2	16	17.00	17.00	20.00	22.00
10 x3 x1⅛	2¼	18	25.00	25.00	28.50	31.00
11 x3½x1¼	2½	20	38.00	38.00	43.00	46.00
11¾x4¼x1½	3	22	55.00	55.00	63.00	68.00
12½x4½x1½	3½	24	70.00	70.00	78.00	86.00
14 x4¾x1¾	4	26	90.00	90.00	.....	110.00

Diamond Wire Rope Tackle Blocks

Regular Pattern


Double with Loose Hook No. 2461


Double with Stiff Swivel Hook No. 2459-Y

Single with Shackle No. 2462

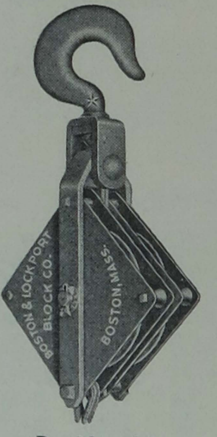
Hooks are drop forged flatted.

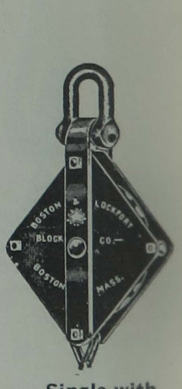
Dimensions Inches		Iron Bushed			Star Metaline or Graphite Bronze Bushed Self-Lubricating		
Sheave	Rope	Single Each	Double Each	Triple Each	Single Each	Double Each	Triple Each
6x1 x ¾	⅜	$6.00	$11.00	$14.00	$9.00	$17.00	$22.00
8x1¼x ⅞	½	8.00	13.00	16.00	11.00	19.00	24.00
10x1¼x ⅞	⅝	10.00	15.00	20.00	13.00	21.00	28.00
12x1½x1	⅝	12.00	17.00	23.00	15.00	23.00	31.00
14x1½x1⅛	¾	14.00	19.00	26.00	17.00	25.00	34.00
16x1¾x1¼	⅞	21.50	31.00	39.50	25.00	38.00	50.00

Diamond Wire Rope Tackle Blocks

Heavy Pattern

Double with Loose-Hook No. 2468


Double with Stiff Swivel Hook No. 2466-Y


Single with Shackle No. 2469

These blocks are made of the finest steel, drop forged flatted hooks. Loose hook and shackle block having double center plates in blocks size 12 inches and larger. The center straps are also double and extend to the bottom of the block.

Dimensions Inches		Each Iron Bushed			Each Star Metaline or Graphite-Bronze Bushed Self-Lubricating		
Sheave	Rope	Single	Double	Triple	Single	Double	Triple
6x1 x ¾	⅜–½	$9.00	$14.00	$20.00	$12.00	$20.00	$28.00
8x1¼x ⅞	½–⅝	11.00	16.00	22.50	14.00	22.00	32.00
10x1¼x1	⅝	14.00	20.00	28.00	17.00	26.00	37.00
12x1½x1⅛	¾	16.00	23.00	31.00	19.00	29.00	41.00
14x1½x1¼	¾–⅞	18.00	25.00	36.00	21.00	31.00	45.00
16x1¾x1½	⅞–1	31.00	40.00	46.00	36.00	50.00	65.00
18x1¾x1½	1	34.50	45.00	60.00	40.00	56.00	75.00

Wrought Iron Snatch Blocks for Wire Rope

Star Brand

Boston
No. 2525

BOSTON & LOCKPORT BLOCK CO.
BOSTON, MASS.

Drop Link
No. 2526

Have drop forged flatted stiff swivel hooks, heads and links.

Boston pattern fitted with safety-locking clasp, consisting of a lip and link and having a center extension piece coming close to sheave, preventing the wire rope from leaving the sheave. It also prevents the shell from pinching or binding the sheave.

Both patterns have shells with projections impressed between mortise above the edges of sheave so as to prevent wire rope from slipping between shell and sheave.

Size Sheave Inches	Diam. Rope Inches	Iron Bushed Each	Graphite-bronze Bushed, Self-lubricating Each	Star Metaline Bushed, Self-lubricating Each
6x1 x ¾	⅜–½	$11.00	$12.00	$12.00
8x1¼x ⅞	½–⅝	14.00	15.00	15.00
10x1¼x1	⅝	16.00	18.00	18.00
12x1½x1⅛	¾	18.00	21.00	21.00
14x1½x1¼	¾–⅞	20.00	24.00	24.00
16x1¾x1½	⅞–1	28.00	33.00	33.00
18x1¾x1½	1	38.00	44.00	44.00
20x2¼x1¾	1¼	50.00	58.00	58.00
20x2¼x1¾	1½	60.00	68.00	68.00

Star Brand Heavy Duty Trucking Snatch Blocks

No. 50 for Wire or No. 51 for Manila Rope

The heavy steel plate shell has impressions on each side to prevent the wire rope from jamming between the shell and sheave.

The safety-locking head with rope guard prevents the wire rope from interfering with the link attachment and jumping out of sheave.

The steel sheaves have bronze bearings with double No. 8 Lubrication groove. Extra large sheave pins with Alemite lubricating system.

The bearing diameter surface and rigidity of block is greatly increased by supplementary steel sleeve over pin.

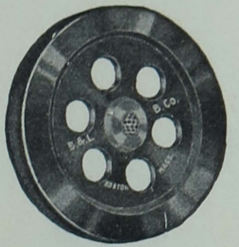
Hooks, heads and links are drop-forged. Extra large hooks.

Size Block, Sheave..............in.	6	8	10
Block Compl. with No. 8 Alemite Bronze Bearing..............each	$22.00	$28.00	$36.00
†Extra Steel Sheaves with No. 8 Alemite Bronze Bearing.......each	7.50	9.50	14.50
Extra Pins.......................each	3.40	3.60	3.70
Size Hooks, No..........................	11	12	13
Diam. Sheave.....................in.	6	8	10
For Diam. Wire Rope.............in.	⅞	1⅛	1⅜
For Diam. Manila Rope...........in.	½	⅝	¾
*Working Load.................tons	6	8	10
Bearing Diam....................in.	1⅝	2¼	2¼
Approx. Weight Block, Compl....lbs.	39	72	97
Approximate Weight Sheaves.....lbs.	6¼	13	18¼

*Above estimated working loads are based on tensile strength of material, allowing very liberal margin of safety. Submitted as a guide in ordering without assuming any responsibility.

†Price on extra sheaves includes supplementary steel sleeve.

Regular Pattern Sheaves for Wire Rope



No. 2592

Outside Diam. In.	Thickness of Rim In.	Diam. of Pin In.	Thickness at Hub In.	Diam. Wire In.	Price, Each: Iron Bushed	Price, Each: Bronze Bushed Self-Lubricating	Price, Each: Metaline Bushed Self-Lubricating
6	1	⅝	1¹⁄₁₆	½	$.80	$1.50	$2.90
6	1	¾	1¹⁄₁₆	½	.80	1.60	3.30
6	1	⅞	1¹⁄₁₆	½	.80	1.70	4.00
8	1¼	¾	1⅜	⅝	1.60	2.60	4.30
8	1¼	⅞	1⅜	⅝	1.60	2.70	4.70
8	1¼	1	1⅜	⅝	1.60	2.80	5.20
8	1½	¾	1⁹⁄₁₆	¾	2.00	3.30	4.80
8	1½	⅞	1⁹⁄₁₆	¾	2.00	3.40	5.20
8	1½	1	1⁹⁄₁₆	¾	2.00	3.50	5.60
8	1½	1⅛	1⁹⁄₁₆	¾	2.00	3.60	6.20
10	1¼	¾	1⅜	⅝	2.20	3.20	4.80
10	1¼	⅞	1⅜	⅝	2.20	3.30	5.20
10	1¼	1	1⅜	⅝	2.20	3.40	5.70
10	1½	⅞	1⅝	¾	2.60	4.00	6.00
10	1½	1	1⅝	¾	2.60	4.10	6.40
10	1½	1⅛	1⅝	¾	2.60	4.20	7.20
12	1½	1	1⅝	¾	3.50	4.90	7.60
12	1½	1⅛	1⅝	¾	3.50	5.00	8.20
14	1½	1	1⅝	⅞	5.30	6.70	9.40
14	1½	1⅛	1⅝	⅞	5.30	6.80	10.00
14	1½	1¼	1⅝	⅞	5.30	7.00	10.20
14	1½	1½	1⅝	⅞	5.30	7.60	11.00
16	1½	1¼	1¾	⅞	6.30	8.60	11.20
16	1½	1½	1¾	⅞	6.30	9.20	11.80
16	1¾	1¼	2	1 & 1⅛	6.90	8.80	12.30
16	1¾	1½	2	1 & 1⅛	6.90	9.40	13.20

Suitable Working Load for a Pair of Wire Rope Blocks

With Loose Hooks or Stiff Swivel Hooks

Diam. Sheave In.	Singles Pattern Reg. Tons	Singles Pattern Hvy. Tons	Singles Pattern Ex. Hvy. Tons	Doubles Pattern Reg. Tons	Doubles Pattern Hvy. Tons	Doubles Pattern Ex. Hvy. Tons	Triples Pattern Reg. Tons	Triples Pattern Hvy. Tons	Triples Pattern Ex. Hvy. Tons
6	1½	1½	2	2	2	2½	2½	2½	3½
8	2	2	2½	2½	2½	3½	3	3	4½
10	2½	2½	3½	3	3	4½	3½	3½	5
12	3	3	4½	4½	4½	5	5½	5½	6
14	4½	4½	5	5½	5½	6	6½	6½	8
16	6½	6½	6½	6½	6½	8	8	8	10
18	6½	6½	6½	6½	6½	8	8	8	10

With Shackles

Diam. Sheave In.	Singles Pattern Reg. Tons	Singles Pattern Hvy. Tons	Singles Pattern Ex. Hvy. Tons	Doubles Pattern Reg. Tons	Doubles Pattern Hvy. Tons	Doubles Pattern Ex. Hvy. Tons	Triples Pattern Reg. Tons	Triples Pattern Hvy. Tons	Triples Pattern Ex. Hvy. Tons
6	2	3	3	3	4	4	4	5	5
8	4	4	4	6	6	6	7	7	7
10	4	4	5	6	6	7	7	7	9
12	5	5	7	7	7	12	8	9	12
14	7	7	8	9	12	14	10	12	14
16	8	10	12	10	18	20	11	18	20
18	10	10	12	13	18	20	14	18	20

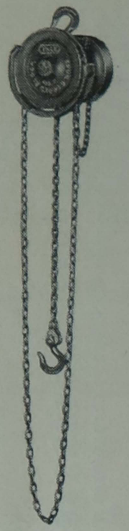
The above is submitted to assist in ordering and without responsibility on the manufacturer's part. Every permanent rig for wire rope should be considered a special problem and all factors should be carefully studied.

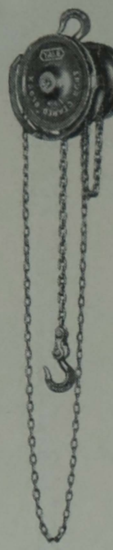
A BLOCK is no stronger than the wire rope with which it is used.

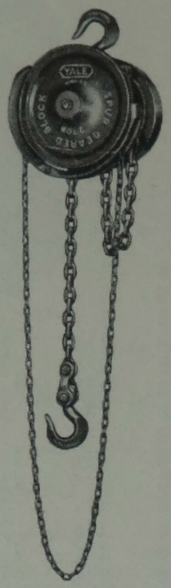
Specify B. & B. Flexset Yellow Strand wire rope for the strongest combination of rope and blocks.

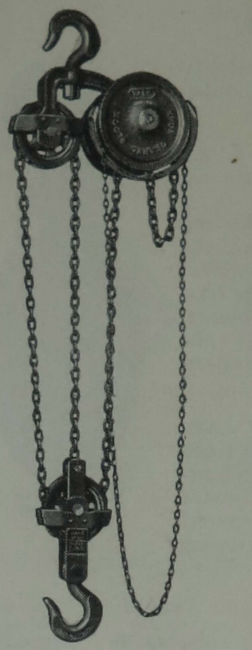
Yale Ball-Bearing Spur-Geared Chain Hoists

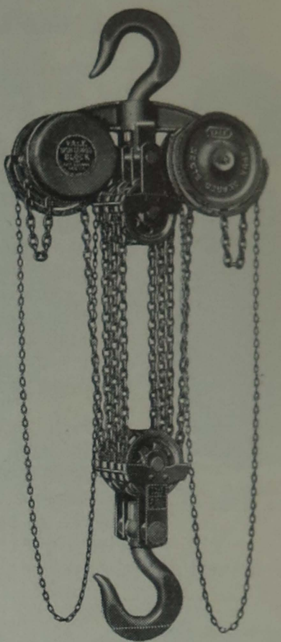
Capacity, ¼ to 40 Tons


¼ to ½ Ton


1 Ton


2 and 3 Tons


5, 6, and 8 Tons


12 and 16 Tons

Hoist mechanism is of the spur gear reduction, planetary system. Gears are mounted on bronze anti-friction bearings, oil duct lubrication. Gear pressure is so balanced that thrust is diametrically opposed, setting up a minimum of stress and maintaining initial high efficiency.

All members in suspension are steel.

Brake load is screw and disc type, self actuating, of ample area, with the ratio of brake pressure increasing in proportion to the increase in load.

Load sheave on which the suspended load is lifted, is mounted on two ball bearings of the radial thrust type, using high carbon chrome alloy steel balls and chrome vanadium races. Bearings are enclosed with dustproof metal and felt oil retaining rings.

Load sheave bearing is ground concentric, with .001 inch working tolerance.

Driving pinion shaft is hardened and ground with .001 inch working tolerance and revolves in bronze bushings in the load sheave. Gear and pinions are provided with bronze bushings.

Yale hooks are drop-forged steel. Hooks will open slowly without fracture under severe overload. This provides warning of danger and permits depositing the load without injury to the operator, to the load, or to the hoist mechanism. Free, easy and universal movement is provided by swiveling on heavy duty ball bearings and swinging or rocking on a crosshead. The ball bearings are totally enclosed against dirt, dust, water, etc.

Yale chain is made exclusively of steel. It is formed, welded, heat-treated, tumbled, and gaged by a controlled process that provides the following physical characteristics:

1.—Chain having the necessary ductility and toughness to withstand heavy intermittent loads, and the characteristics whereby it will stretch before breaking.

2.—Uniformity as to size, with all links gaged on master gages for accuracy of pitch and overall dimensions.

3.—A minimum strength at the weld equal to the ultimate strength of the chain.

Drop-forged 2-piece shackles with heat-treated suspension pin permits changing or replacing load chain without welding. Hand chain guide is continuous and adjustable which prevents fouling of hand chain.

Lubrication: Hoisting gears, oil and grease; bearings and brake, oil duct with ball valve dustproof oilers.

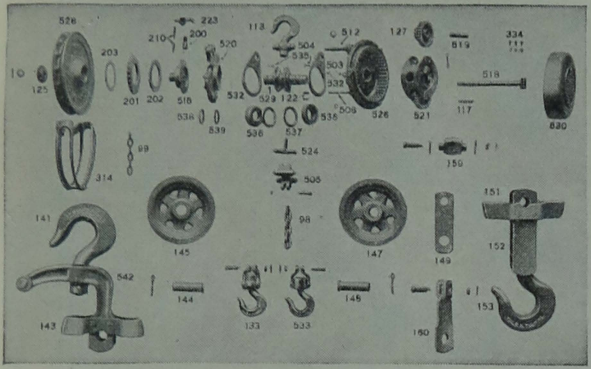
The final test on all finished units is with 50 per cent overload, long ton rating.

Model	Rated Capacity Long Tons	Complete, Standard Lift Each	Extra Lift Per Foot	Travel of Lower Hook of Standard Lift, Feet	Test Load in Long Tons	Minimum Distance Between Hooks Inches	Chain Pull to Lift Full Load Pounds	Chain Overhauled to Lift Load Foot Feet	Hoisting Speeds Feet per Minute Full Load	Half Load	Quarter Load	Net Weight Pounds
BB	**300**	**$60.00**	**$1.80**	8	504	12	44	8	28	54	75	62
BB	**¼**	**70.00**	**1.80**	8	⅜	12	47	12½	17	30	45	61
BB	**¼QS**	**70.00**	**1.80**	8	⅜	12	74	8	17	32	48	61
BB	**½**	**70.00**	**1.80**	8	¾	12	57	21	8½	17	26	61
BB	**½QS**	**90.00**	**1.90**	8	¾	15½	85	14	9	18	27	94
BB	**1**	**90.00**	**1.90**	8	1½	15½	76	31	4¼	8.5	13	94
BB	**1½**	**120.00**	**2.00**	8	2¼	18	103	35	5.1	10.2	15.3	136
BB	**2**	**140.00**	**2.10**	9	3	21	112	42	3.9	7.8	11.7	204
BS	3S	**180.00**	**2.60**	10	4½	23	102	77	2.5	5.0	7.5	268
BB	**3**	**180.00**	**3.00**	10	4½	32	107	70	2.5	5.0	7.5	212
BB	**4**	**220.00**	**3.20**	10	6	37	116	84	1.9	3.8	5.7	301
BB	**5**	**280.00**	**4.30**	12	7½	45	102	126	1.4	2.8	4.2	413
BS	5D	**280.00**	**4.20**	12	7½	34	90	154	1.4	2.8	4.2	388
BB	**6**	**330.00**	**4.30**	12	9	45	122	126	1.2	2.4	3.6	413
BS	6D	**330.00**	**4.20**	12	9	34	108	154	1.2	2.4	3.6	388
BB	**8**	**400.00**	**5.40**	12	12	49	127	168	.85	1.7	2.6	502
BB	**10**	**480.00**	**6.50**	12	15	54	132	210	.65	1.3	2.0	612
BB	**12**	**600.00**	**8.60**	12	18	54	122‡	126‡	1.2	2.4	3.6	860
BB	**16**	**720.00**	**10.80**	12	24	62	127‡	168‡	.85	1.7	2.6	1046
BB	**20**	**850.00**	**13.00**	12	30	62	132‡	210‡	.65	1.3	2.0	1230
BB	**25**	**950.00**	**13.00**	12	37½	62	165‡	210‡	.50	1.0	1.5	1250
BS	**30**	**1700.00**	**18.00**	12	45	64	118‡	385‡	.40	.8	1.2	2150
BS	**40**	**2700.00**	**25.00**	12	60	71	120‡	539‡	.30	.6	.9	3200

S—single Chain. D-double Chain. ‡For each hand chain.

Parts for Yale Spur-Geared Chain Hoists

Models BB, BS, SS and 1898



Parts for Model BB

All hoists without the words "1898 Model", "Model SS", "Model BB" or "Model BS" cast on side of hand wheel or gear cover are old style made prior to 1898. Be sure to state which model parts are for.

‡Parts should be specified "Quick Speed" for hoists so marked on gear cover.

†Parts Nos. 221, 521, 129, 329 and 529 are a drive fit. In assembling see that the holes in Nos. 127, 527, 527S line up at the center. Many parts for trolley hoists are special. Specify model, capacity and size of I-beam.

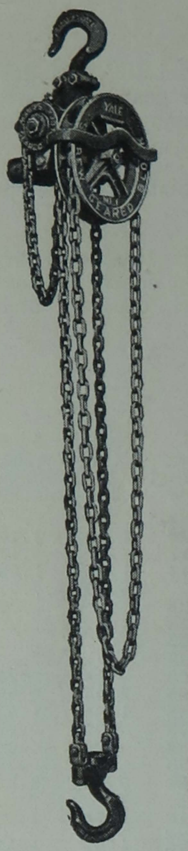
Part No. 1898 Model	Part No. Model SS	Part No. Models BB & BS	Name of Part		¼-Ton	½-Ton	1-Ton	1½-Ton	2-Ton	3-Ton Dbl. Load Chain	3-Ton Sgl. Load Chain	4 to 25-Ton	5 & 6 Ton Dbl. Load Chain Model BS
113	113	113	Top Hook and Nut	ea.	$1.85	$1.85	$2.95	$3.65	$4.40	.....	$8.80	.....	.....
117	117	117	Disc Hub Key	ea.	.15	.15	.18	.19	.20	$.19	.20	$.20	$.20
122	122	122	Load Sheave Key	ea.	.09	.09	.10	.15	.17	.15	.17	.17	.17
125	125	125	Check Washer	ea.	.65	.65	.90	1.10	1.25	1.10	1.25	1.25	1.25
127	127	127	Gear and Pinion	ea.	2.60‡	2.60‡	3.30	4.40	5.90	4.40	.....	5.90	.....
133	133	133	Lower Swivel Hook	ea.	3.65	3.65	5.50	6.60	8.80	.....	10.25	.....	.....
133A	133A	133A	Detach, Shackle Bolt, Nut, Cotter	ea.	.18	.18	.18	.18	.18	.....	.32	.....	.....
133B	133B	133B	Detachable Shackle Link	ea.	.30	.30	.30	.50	.50	.....	.65	.....	.....
133C	133C	133C	Bot. Crosshead Washer	ea.	.05	.05	.05	.05	.05	.....	.05	.....	.....
200	200	200	Pawl Stud	ea.	.50	.50	.75	.90	.95	.90	.95	.95	.95
201	201	201	Ratchet Disc	ea.	1.50	1.50	2.00	2.60	2.95	2.60	2.95	2.95	2.95
202	202	202	Leather Disc	ea.	.95	.95	1.10	1.45	1.45	1.45	1.45	1.45	1.45
203	203	203	Galvanized Iron Disc	ea.	.30	.30	.45	.60	.75	.60	.75	.75	.75
210	210	210	Pawl Spring and Rod	ea.	.15	.15	.25	.30	.30	.30	.30	.30	.30
223	223	223	Pawl	ea.	.60	.60	.75	.90	.90	.90	.90	.90	.90
314	314	314	Hand Chain Guide	ea.	4.40	4.40	5.15	7.35	8.80	7.35	8.80	8.80	8.80
...	334	334	Gear Cover Screw and Washer	ea.	.03	.03	.03	.03	.03	.03	.....	.03	.....
103	303	503	Small Separator and Nut	ea.	.60	.60	.75	.90	1.10	.90	1.10	1.10	1.10
104	104	504	Top Crosshead	ea.	1.10	1.10	1.60	2.35	2.95	.....	2.95	.....	.....
105	305	505	Load Chain Guide and End Bolt	ea.	1.10	1.10	1.45	2.20	2.55	2.20	3.50	2.55	3.50
108	308	508	Load Chain Guide Bolt and Nut	ea.	.30	.30	.55	.60	.75	.60	.75	.75	.75
112	312	512	Large Separator and Nuts	ea.	.95	.95	1.10	1.35	1.45	1.45	1.45	1.45	1.45
216	216	516	Disc Hub	ea.	3.50	3.50	4.40	6.60	8.10	6.60	8.10	8.10	8.10
218	318	518	Driving Pinion	ea.	4.40‡	4.40‡	5.15	7.35	8.80	7.35	8.80	8.80	8.80
119	119	519	Gear and Pinion Pin	ea.	.65‡	.65‡	.90	1.10	1.35	1.10	1.35	1.35	1.35
...	...	519S	Gear and Pinion Pin	ea.	....	....	....	.....	.....	.....	1.35	.....	1.35
220	320	520	Ratchet Case	ea.	4.40	4.40	6.60	8.80	9.55	8.80	9.55	9.55	9.55
†221	†221	†521	Pinion Cage	ea.	3.65‡	3.65‡	5.15	7.35	9.55	7.35	14.50	9.55	14.50
124	324	524	Stripper	ea.	.50	.50	.50	.75	.90	.75	.90	.90	.90
126	326	526	Internal Gear	ea.	7.35	7.35	8.80	12.50	14.00	12.50	14.00	14.00	14.00
...	...	527	Gear and Pinion	ea.	....	....	....	.....	.....	.....	6.75	.....	6.75
...	...	527S	Gear and Pinion	ea.	....	....	....	.....	.....	.....	6.75	.....	6.75
228	328	528	Hand Wheel	ea.	4.40‡	4.40‡	5.15	7.35	8.80	7.35	8.80	8.80	8.80
†129	†329	†529	Load Sheave	ea.	7.35	7.35	8.80	13.25	14.70	13.25	18.00	14.70	18.00
130	330	530	Gear Cover	ea.	2.20‡	2.20‡	3.30	5.15	5.90	5.15	6.50	5.90	6.50
...	332	532	Suspension Plate	ea.	1.50	1.50	2.95	4.40	5.50	4.40	5.50	5.50	5.50
....	....	533	Ball-Bearing Lower Swivel Hook	ea.	4.65	4.65	6.50	8.00	10.80	.....	12.50	.....	.....
....	....	133A	Detach. Shackle Bolt, Nut, Cotter	ea.	.18	.18	.18	.18	.18	.....	.32	.....	.....
....	....	533B	Detachable Shackle Link	ea.	.30	.30	.30	.50	.50	.....	.65	.....	.....
....	....	533C	Bot. Crosshead Washer	ea.	.05	.05	.05	.05	.05	.....	.05	.....	.....
....	....	535	Gear Cover Screw and Washer	ea.	.02	.02	.02	.02	.02	.02	.05	.02	.05
....	....	534	Suspension Plate Rivet	ea.	....	....	....	.....	.....	.....	.03	.....	...
....	....	536	Ball Bearing Complete	ea.	3.70	3.70	4.75	5.25	6.30	5.25	9.75	6.30	9.75
....	....	537	Inner Oil Retainer	ea.	.40	.40	.55	.65	.75	.65	.75	.75	.75
....	....	538	Outer Felt Retainer	ea.	.05	.05	.06	.06	.06	.06	.15	.06	.15
....	....	539	Outer Felt Washer	ea.	.05	.05	.06	.06	.06	.06	.15	.06	.15
....	....	....	Load Chain, only Steel, per ft		.80	.80	.90	1.00	1.10	1.00	1.60	1.10	1.60
....	....	....	Hand Chain, Steel, per ft		.50	.50	.50	.50	.50	.50	.50	.50	.50

Additional Parts—3 to 25 Tons Inclusive

Part No. 1898 Model	Part No. Model SS	Part No. Models BB & BS	**Top Block** Name of Part		3-Ton	4-Ton	5-Ton Triple Load Chain	6-Ton. Triple Load Chain	5 and 6-Ton Dbl. Load Chain	8-Ton	10-Ton	12-Ton	16-Ton	20 and 25-Ton
141	341	141	Top Hook and Nut	ea.	$8.80	$13.25	$17.65	$26.50	$17.65	$36.75	$51.50	$55.15	$73.50	$161.80
142	342	542	Top Yoke	ea.	20.60	30.90	36.75	44.10	26.50	58.80	88.25	95.60	103.00	110.30
143	143	143	Top Guard and Guides	ea.	.....	.....	10.30	14.70	.....	17.65	22.00	23.50	25.00	26.50
144	144	144	Top Sheave Pin	ea.	.....	.....	1.85	3.65	.....	4.40	5.15	5.15	6.60	8.80
145	145	145	Top Sheave	ea.	.....	.....	6.60	6.60	.....	6.60	8.80	8.80	8.80	8.80
...	...	542S	Top Cross Pin	ea.	.....	.....	.....	.....	2.20	.....	.....	.....	......	......
...	...	...	Number of Sheaves		0	0	1	1	0	1	2	2	3	4
			Bottom Block											
147	147	...	Bottom Sheave	ea.	$5.90	$6.60	$6.60	$6.60	.....	$6.60	$8.80	$8.80	$8.80	$8.80
...	...	547	Bottom Sheave	ea.	.....	.....	.....	.....	$10.75	.....	.....	.....	......	......
...	...	...	Number of Sheaves		1	1	1	1	1	2	2	3	4	5
148	148	148	Bottom Sheave Pin	ea.	$1.45	$1.85	$2.20	$4.00	$2.20	$4.40	$5.15	$5.15	$6.60	$8.80
149	149	149	Becket Straps	ea.	.....	.....	7.35	11.00	.....	13.25	14.70	.....	......	......
151	151	151	Bottom Guards and Guides	ea.	8.10	11.00	11.00	14.70	.....	17.65	22.00	23.50	25.00	29.40
152	152	152	Bottom Side Plates and Crosshead	ea.	7.35	10.30	14.00	23.50	.....	29.40	36.75	36.75	39.70	42.65
153	153	153	Bottom Hook and Nut	ea.	8.80	13.25	17.65	26.50	17.65	36.75	51.50	55.15	73.50	161.80
...	...	159	Detach. Shackle Crosshead and Bolt	ea.	.....	.....	3.80	3.80	.....	.....	.....	.....	......	......
...	...	160	Detach. Shackle Plate and Bolt	ea.	.....	.....	.....	.....	.....	6.35	6.35	.....	......	......
...	...	551	Bottom Guard and Guide	ea.	.....	.....	.....	.....	11.00	.....	.....	.....	......	......
...	...	552	Bottom Side Plate and Crosshead	ea.	.....	.....	.....	.....	14.00	.....	.....	.....	......	......

Yale Screw-Geared Chain Hoists

½ to 5 Tons



Where the higher speed of the Yale spur-geared hoist is not required, the Yale Screw-Geared Hoist is recommended. It is well adapted for portable use, and though light, is powerful and durable. It holds the load securely, and will not lower except as the hand chain is pulled. It is operated on the worm wheel and screw principle. The hand chain drives a sprocket wheel directly keyed to the worm shaft; the worm meshes into the worm wheel, which in turn drives the shaft holding the two load sheaves.

The Yale Screw-Geared Hoist is about one-half as efficient as the Yale Ball Bearing Spur-Geared Hoist and about 25 per cent more efficient than ordinary screw hoists. This hoist is operated by a light chain pull. With a 1-ton block, 1 man, by pulling only 87 pounds, can lift 2000 pounds. However, the relatively large overhaul of hand chain required to lift the load makes it proportionately slow in operation. This is essentially a hoist for riggers and for temporary and occasional service, as it may be readily moved to meet an emergency. It is adaptable also to horizontal work when pulling heavy loads on rollers or skids. The worm gear makes this block compact and good for lifting loads in cramped places and close up to the ceiling.

The load is carried by Yale steel load chains, and safety guides are provided to prevent the chains from jumping off the load sheaves. Every precaution has been taken in the design of the bottom crosshead and new demountable shackles to eliminate all possibility of kinking the load chains. It often happens that the bottom hook is turned through the two load chains. When this happens the swiveling demountable shackles between the load chains and the bottom crosshead connection prevent twisting of the chains.

The new demountable shackles enable the hook to be attached to longer load chains without welding. To do this it is only necessary to insert the hardened steel pins through the swiveling shackles and the last link on the load chain.

The steel pin, heat-treated and drop-forged, is of a special oval shape to fit the contour of the link and give it a full bearing surface.

A special process of heat-treating is used on the thrust end of the worm shaft to harden its wearing surface and at the same time improve the strength and wearing quality of the worm itself. The bronze worm wheel and the steel worm (or screw) which have hardened and ground thrust-bearings, run in oil and graphite in a litharge-sealed case, insuring smooth action and thorough lubrication. A special quality of bronze is used in the worm gear which is cast on a square but solid steel shaft.

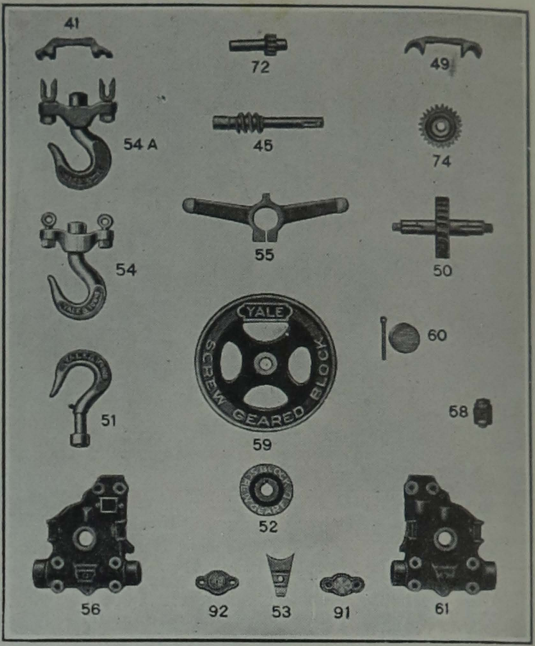
Rated Cap. Tons	Complete Each	Extra Lift per Foot	*Std. Lift in Ft.	Test Load in Long Tons	Min. Distance between Hooks In.	†Chain Pull Lbs.	†Chain Pull Ft.	Ship. Wt. Lbs.
½	$50.00	$2.50	8	¾	14	68	40	56
1	60.00	2.60	8	1½	16	87	59	73
1½	80.00	2.70	8	2¼	19	94	80	100
2	100.00	2.80	9	3	21	115	93	130
3	150.00	3.00	10	4½	25	132	126	234
4	190.00	3.80	10	6	26	142	155	265
5	280.00	4.00	12	7½	31	145	195	406

*Figures denote height in feet which hoists with regular lengths of chain, will lift from level on which operator stands.

†Figures denote the pull in pounds required to lift the full load, and the number of feet of hand chain which must be overhauled to lift load one foot.

Yale Screw-Geared Hoist Parts

½ to 5 Tons



No.	Name	Price, Each — Capacity, Tons ½	1	1½	2
41	Load Chain Guide......	$ 85	$1 00	$1 70	$2.15
45	Worm and Shaft........	4 30	5.70	8 55	10.00
49	Load Chain Guard......	1 20	1 45	2 15	2.50
50	Worm Wheel............	7 15	8 55	12.15	17.15
51	Top Hook and Nut......	1.80	2.85	4.30	6.45
52	Load Sheave....per pair	2.85	3.95	5.70	6.45
53	Strippers........per pair	.45	.55	.85	1.10
54	Bottom Hook Crosshead and Eye Bolts........	3.60	5.00	6.45	8.55
54A	Bottom Hook Crosshead with New Detachable Shackles..............	3.60	5.00	6.45	8.55
55	Hand Chain Guide......	2.50	2.85	4.30	5.70
56 61	Housing.........per pair	9.30	11.45	17.15	21.45
58	Friction Plug...........	1.45	2.15	2.85	3.60
59	Hand Wheel............	*3.20	*3.95	*5.70	*6.80
60	Friction Plug Cover.....	.70	.70	1.10	1.45
..	*Load Chain, Steel.per ft.	.75	.80	.85	.90
..	Hand Chain, Steel.per ft.	† .50	† .50	† .50	† .50

No.	Name	Price, Each — Capacity, Tons 3	4	5	
41	Load Chain Guide......	$2.50	$2.85	$4.30	.....
45	Worm and Shaft........	12.85	14.30	17.15	.....
49	Load Chain Guard......	2.85	3.20	4.30	.....
50	Worm Wheel............	24.30	28.60	42.85	.....
51	Top Hook and Nut......	10.70	14.30	21.45	.....
52	Load Sheave....per pair	8.55	10.70	14.30	.....
53	Strippers........per pair	1.80	2.15	2.85	....
54	Bottom Hook Crosshead and Eye Bolts........	14.30	20.00	28.60	.....
54A	Bottom Hook Crosshead with New Detachable Shackles..............	14.30	.....	.....	.....
55	Hand Chain Guide......	6.45	7.85	7.85	.....
56 61	Housing.........per pair	30.00	42.85	85.70	.....
59	Hand Wheel............	*7.85	*11.45	*12.85	.....
72	Pinion Shaft...........	5 70	6.45	10.00	.....
74	Gear..................	6 00	6.80	7.50	.....
91	Friction Plug Cover.....	.70	.70	.70	.....
92	Friction Plug...........	4 30	4.30	5.70	.....
..	Load Chain, Steel.per ft.	1.00	1.10	1.20	.....
..	*Hand Chain, Steel.per ft.	†.50	†.50	†.50	.....

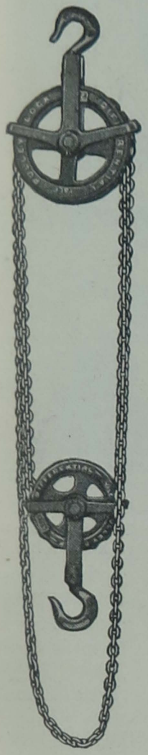
*When ordering hand wheels or hand chain give number of pockets in rim of wheel.

†Hand chain for old model blocks 75 cents per foot for ½, 1, 1½ and 2-ton sizes; 80 cents per foot for 4 and 5-ton sizes.

Note.—When ordering parts it is necessary to give the size of the block in addition to the part number.

Yale Differential Chain Hoists

¼ to 2 Tons



The Yale Differential Chain Hoist is designed for service where comparatively light loads are handled occasionally. It consists of a pair of pocketed chain wheels above and a single wheel below. The endless chain passes over one upper sheave, down around the bottom block and then over the other upper sheave. The two upper sheaves are in one piece and only vary enough in diameter to make a difference of one chain pocket in their circumferences.

The overhaul of hand chain is about the same as that of the Yale Spur-Geared chain hoist, but the hand chain pull required is about 2½ times as great. The hoist, however, is light and easily handled, and where men are readily available for emergency or infrequent work, it is desirable equipment. It holds the load securely and will lower only as the hand chain is pulled.

It has few parts, and on account of its reliability and simplicity is especially adapted for use in garages and for all ordinary hoisting purposes where the higher power and durability of the Yale Spur-Geared and Screw-Geared Hoists are not required.

Standard Yale drop-forged steel safety hooks are used on all Yale Differential Chain Hoists. The large, well proportioned sheaves have correctly formed pockets into which the Yale die-formed, electrically welded steel chain meshes accurately. Provision is made for the lubrication of bearings.

This hoist possesses the excess capacity that is the distinctive feature of all Yale hoisting equipment. Protection of life and property is the first consideration in its construction.

Rated Cap. Tons	Complete Standard Lift Each	Extra Lift per Foot	Std. Lift in Feet	Test Load in Long Tons	Min. Distance between Hooks In.	Chain Pull Lbs.	Chain Pull Ft.	Ship. Wt. Lbs.
¼	**$36.00**	**$4.80**	6	⅜	17	72	18	28
½	**42.00**	**4.80**	7	¾	21	110	24	36
1	**56.00**	**5.00**	8	1½	26	190	30	60
1½	**72.00**	**5.40**	8½	2¼	32	225	36	94
2	**90.00**	**5.60**	9	3	39	300	42	146

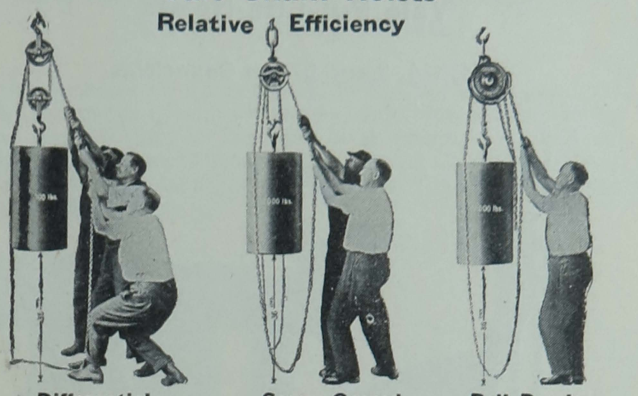
Parts

No.	Description	Each For Hoist, Cap., Tons ¼	½	1
11	Top Yoke and Hook.......	**$5.00**	**$6.00**	**$8.50**
12	Top Sheave................	**6.25**	**8.00**	**12.00**
13	Bottom Sheave...........	**1.80**	**2.40**	**3.00**
14	Bottom Yoke and Hook...	**4.00**	**5.00**	**7.00**
15	Top Sheave Pin...........	**.80**	**1.00**	**1.00**
16	Bottom Sheave Pin.......	**.60**	**.80**	**.80**
..	Regular Chain............	**26.40**	**31.20**	**37.50**

No.	Description	Each For Hoist, Cap., Tons 1½	2	3
11	Top Yoke and Hook.......	**$11.00**	**$15.00**	**$22.00**
12	Top Sheave................	**16.80**	**24.00**	**31.20**
13	Bottom Sheave...........	**3.80**	**5.00**	**7.50**
14	Bottom Yoke and Hook...	**9.00**	**12.00**	**16.00**
15	Top Sheave Pin...........	**1.20**	**1.20**	**1.40**
16	Bottom Sheave Pin.......	**1.00**	**1.00**	**1.20**
..	Regular Chain............	**44.60**	**50.40**	**57.00**

Yale Chain Hoists

Relative Efficiency



Differential
3 Men
1 Minute
3 Seconds

Screw-Geared
2 Men
1 Minute
7 Seconds

Ball Bearing Spur-Geared
1 Man
42 Seconds

These illustrations show the time and the number of men of average strength required to lift a load of 1 ton (2000 pounds) 3 feet high, using the 3 types of Yale Chain Hoists.

Hand Chain Pulls, Etc.

Rated Cap. Tons	Pull in Pounds on Hand Chain to Lift Capacity Loads, 2000 Lbs. to Ton: Spur-Geared	Screw-Geared	Differential	Feet of Hand Chain Overhauled to Lift Load One Foot: Spur-Geared	Screw-Geared	Differential	Load One Man Lifts with Pull of 76 Pounds: Spur-Geared	Screw-Geared	Differential
¼	47	...	72	12½	...	18	500	....	500
½	57	68	**110**	21	40	24	1000	1000	690
† ½	85	..	...	14	..	..	690	....	...
1	76	87	190	31	59	30	2000	1600	810
1½	103	94	225	35	80	36	2200	2420	1010
2	112	115	300	42	93	42	2720	2640	1010
3	107	132	...	70	126	..	4250	3460	....
3S	102	...	...	77	...	..	4470	....	....
4	116	142	...	84	155	..	5240	4300	....
5	102	145	...	126	195	..	7450	5250	....
5D	90	...	...	154	...	..	8440	....	....
6	122	...	...	126	...	..	7450	....	....
6D	108	...	...	154	...	..	8440	....	....
8	127	...	...	168	...	..	9600	....	....
10	132	...	...	210	...	..	11500	....	....
12	*122	...	...	*126	...	..	14000	....	....
16	*127	...	...	*168	...	..	19000	....	....
20	*132	...	...	*210	...	..	23000	....	....
25	*165	...	...	*210	...	..	23000	....	....

*For each hand chain. †Special quick speed hoist.

Hoisting Speeds

For short lifts with men accustomed to the work. For easy, continuous lifting, two-thirds of these speeds are attainable. The Yale Spur-Geared Hoist lifts rapidly and the speed increases for light loads. Allows the load to be lowered rapidly. 12, 16 and 20-ton spur-geared hoists have two hand chains each, permitting two men to hoist simultaneously, securing double speed.

Figures below are based on a ton of 2000 pounds.

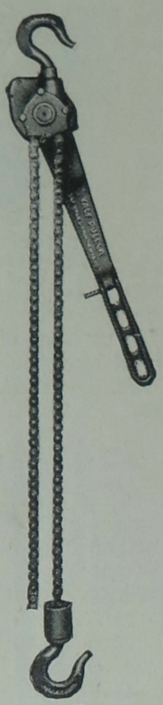
Feet per Minute Attainable and Number of Men Needed to Lift Capacity Loads without Pulling over 76 Pounds

Rated Cap. Tons	Spur-Geared: Full Load	Half Load	Quarter Load	*No. of Men	Screw-Geared: Full Load	*No. of Men	Differential: Full Load	*No. of Men
¼	17	30	45	1	...	..	6	1
½	8.5	17	26	1	4	1	6	2
†½	9	18	27	1	...	..	...	..
1	4.25	8.5	13	1	2	1	3.7	3
1½	5.1	10.2	15.3	2	2.4	2	2.5	3
2	3.9	7.8	11.7	2	1.8	2	2.3	4
3	2.5	5	7.5	2	1.1	2	...	..
3S	2.5	5	7.5	2	...	..	...	..
4	1.9	3.8	5.7	2	.8	2	...	..
5	1.4	2.8	4.2	2	.65	2	...	..
5D	1.4	2.8	4.2	2	...	..	...	..
6	1.2	2.4	3.6	2	...	..	...	..
6D	1.2	2.4	3.6	2	...	..	...	..
8	.85	1.7	2.6	2	...	..	...	..
10	.65	1.3	2	2	...	..	...	..
12	1.2	2.4	3.6	4	...	..	...	..
16	.85	1.7	2.6	4	...	..	...	..
20	.65	1.3	2	4	...	..	...	..
25	.50	1	1.5	4	...	..	...	..

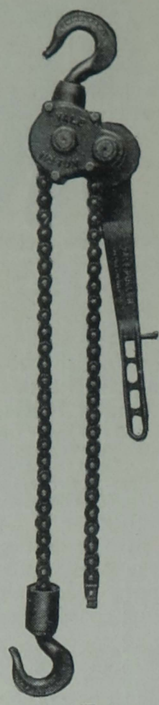
*Number of men is based on each man pulling not over 76 pounds. †Special quick speed hoist.

Yale Pul-Lift Hoists

¾, 1½, 3 and 6-Ton Capacities



¾-Ton



1½-Ton

3-Ton

The Pul-Lift was designed to meet the specific requirements of industry for a general purpose tool, for pulling and hoisting, embodying the following general characteristics: Light weight; close headroom or minimum distance between hooks; simple and efficient in operation—easy for one man to operate within its rated capacity; self-actuated load brakes; ratchet or universal action to permit of use in congested quarters; compact and rugged to withstand normal abuse.

The Pul-Lift operates by means of a ratchet, which actuates a lifting sprocket. The ratchet action permits of short strokes on the handle with the load supported on the brake at any point of the lifting action.

The direction of hook travel is governed by a pawl, actuated on the handle grip.

The brake and ratchet action embodied in the tool facilitates close spotting of loads and the self-actuating brake eliminates the possibility of flying handle.

This hoist weighs approximately 25 per cent as much as the conventional portable hoist. It is ideal for riggers' equipment and designed for operation in close quarters.

All parts of the hoist body are enclosed, and operate in grease, thereby being protected from injury.

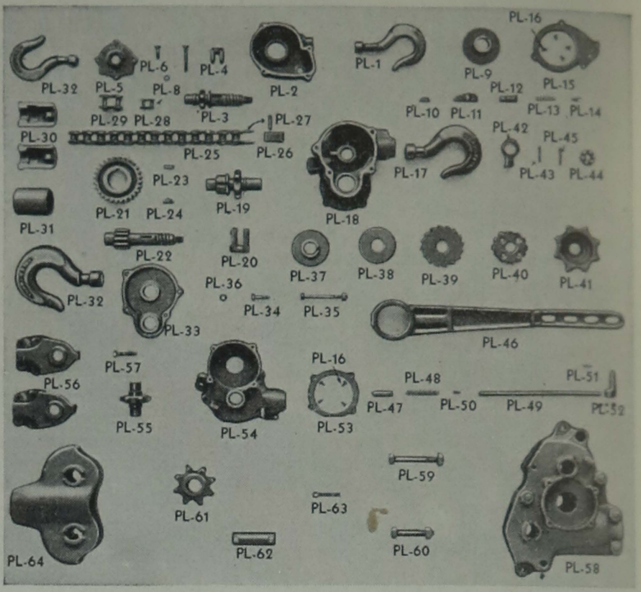
When lowering the load, the handle is operated in a manner similar to the lifting or pulling operation. It cannot fly back at any time to cause injury to the workman.

The hoist operation is easily accomplished and is controlled by a small thumb turn on the handle.

Cap. Tons	Complete Std. Lift Each	Extra Lift per Foot	Std. Lift In.	Pull on Lever to Lift Full Load Lbs.	Lgth. Lever In.	Min. Dist. Between Hooks In.	Hoist. Speed Full Load F.P.M.	Std. Lgth. Chain Ft.	Ship. Wt. Lbs.
¾	$45.00	$.90	55	70	$17\frac{7}{16}$	12	4	5	18½
1½	63.00	1.70	53	85	$17\frac{7}{16}$	14	2	5	32
3	80.00	3.40	54	94	$17\frac{7}{16}$	17¾	1	10	44
6	155.00	6.80	52	112	$17\frac{7}{16}$	25	5 In.	20	107

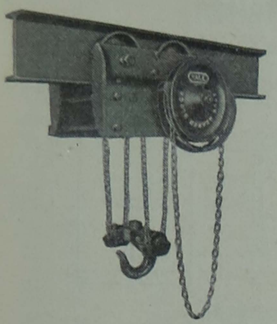
Pul-Lift Replacement Parts

¾, 1½, 3 and 6-Ton Capacities

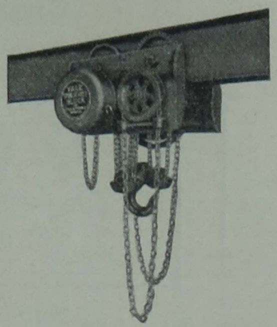


No.	Name of Part	¾-Ton Ea.	1½-Ton Ea.	3-Ton Ea.	6-Ton Ea.
PL1	Top Hook and Nut	$2.20	....	....	.....
PL2	Housing, ¾-Ton	6.00	....	....	.....
PL3	Sprocket	5.50	....	....	.....
PL4	Stripper	.50	....	....	.....
PL5	Housing Cover	3.00	....	....	.....
PL6	Cover Cap Screw	.10	....	....	.....
PL7	Stripper Cap Screw	.05	....	....	.....
PL8	Lockwasher, ¼-Inch	.01	....	....	.....
PL9	Disc Hub	1.50	....	....	.....
PL10	Disc Hub Key	.08	....	....	.....
PL11	Load Brake Pawl	.60	....	....	.....
PL12	Pawl Stud	1.00	....	....	.....
PL13	Brake Pawl Spring	.05	$.05	$.05	$ .05
PL14	Brake Pawl Spring Rod	.05	.05	.05	.05
PL15	Load Brake Cover	.25	....	....	.....
PL16	Load Brake Cover Screw	.02	.02	.02	.02
PL17	Top Hook and Nut	.....	3.35	4.20	10.00
PL18	Housing, 1½-Ton	.....	7.00	7.00	.....
PL19	Sprocket	.....	7.00	7.00	7.00
PL20	Stripper	.....	.50	.50	.50
PL21	Gear	.....	5.00	5.00	5.00
PL22	Pinion	.....	6.00	6.00	6.00
PL23	Sprocket Key	.....	.20	.20	.20
PL24	Disc Hub Key	.....	.08	.08	.08
PL25	Spec. Alloy Load Chain:				
	5-Ft. Unit	6.30	10.00	....	.....
	10-Ft. Unit	.....	.....	19.35	.....
	20-Ft. Unit	.....	....	....	37.90
PL26	Chain Stop	.65	.75	.75	.....
PL27	Offset Link	.40	.90	.90	.....
PL28	Connecting Link	.15	....	....	.....
PL29	Connecting Link	.....	.25	.25	.30
PL30	Bottom Swivel ..... per pair	1.25	1.35	....	.....
PL31	Swivel Band	.35	.75	....	.....
PL32	Bottom Hook and Nut	2.10	3.35	4.20	10.00
PL33	Housing Cover	.....	3.50	3.50	.....
PL34	Cover Cap Screw	.....	.02	.02	.....
PL35	Stripper Bolt and Nut	.....	.08	.08	.08
PL36	Lockwasher	.....	.01	.01	.01
PL37	Disc Hub	.....	1.50	1.50	1.50
PL38	Raybestos Disc	.35	.35	.35	.35
PL39	Ratchet Disc	2.00	2.00	2.00	2.00
PL40	Ratchet	4.00	4.00	4.00	4.00
PL41	Handwheel	2.00	2.00	2.00	2.00
PL42	Load Brake Pawl	.....	.65	.65	.65
PL43	Pawl Holding Pin	.....	.05	.05	.05
PL44	Hex Nut, Slotted	.06	.06	.06	.25
PL45	Cotter Pin	.03	.03	.03	.03
PL46	Ratchet Lever	6.00	6.00	6.00	6.00
PL47	Ratchet Lever Pawl	.30	.30	.30	.30
PL48	Lever Pawl Spring	.05	.05	.05	.05
PL49	Lever Pawl Spring Rod	.35	.35	.35	.35
PL50	Pawl Rod Pin	.05	.05	.05	.05
PL51	Lever Rod Pin	.05	.05	.05	.05
PL52	Pawl Rod Lever	.35	.35	.35	.35
PL53	Load Brake Cover	.....	.50	.50	.50
PL54	Housing, 3-Ton	.....	....	7.00	.....
PL55	Bottom Sprocket	.....	....	5.00	.....
PL56	Bottom Frame .... per pair	.....	....	2.50	.....
PL57	Bottom Frame Screw	.....	....	.02	.....
PL58	Housing, 6-Ton .... per pair	.....	....	....	50.00
PL59	Housing Bolt & Nut, Long	.....	....	....	.15
PL60	Housing Bolt & Nut, Short	.....	....	....	.15
PL61	Sprocket, 8-Teeth	.....	....	....	5.00
PL62	Sprocket, Shaft	.....	....	....	2.00
PL63	Cotter Pin	.....	....	....	.03
PL64	Bottom Frame	.....	....	....	14.00

Yale Rail Hugger Chain Hoists



Plain Type



Geared Type

Designed to meet the demand of industry for a hoist with the closest possible headroom which is the distance from the underside of the I-beam track to the bearing point of the hoist hook in the highest position.

In this close headroom combination is provided the shortest headroom available in a hand hoist. The headroom occupied by the hoist is approximately 75% less than the standard hook type hoist with trolley. It is furnished in either plain or geared type.

Hoist mechanism: Spur gear reduction, planetary system. Gears are mounted on bronze anti-friction bearings, oil duct lubrication. Gear pressure is so balanced that the thrust is diametrically opposed, setting up a minimum of stress and maintaining the initial high efficiency.

All members in suspension are steel.

Load brake is screw and disc type, self-actuating, of ample area, with the ratio of brake pressure increasing in proportion to the increase in load.

Load sheaves, on which the suspended load is lifted, are mounted on two ball bearings, radial thrust type, using high carbon chrome alloy steel balls and chrome vanadium races.

Chain is steel, having the necessary ductility and toughness to withstand heavy intermittent loads, and the characteristics whereby it will stretch before breaking.

Hooks are drop-forged steel and will open slowly without fracture under severe overload, thus giving warning of danger. Hook assemblies are designed both to swivel and swing.

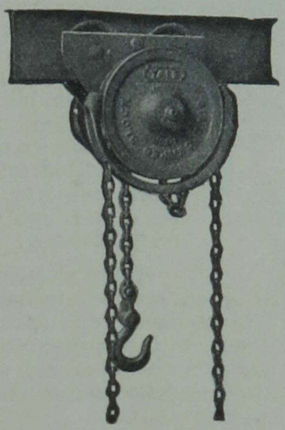
Lubrication: Hoisting gears, oil and grease; bearings and brake, oil duct with ball valve dustproof oilers; wheels, alemite fittings.

Rated Cap. Long Tons	Plain Complete	Plain Extra Lift per Ft.	Geared Complete	Geared Extra Lift per Ft.	I-Beam Size Std. In.	I-Beam Size Std. Lbs.	I-Beam Size Max. In.	I-Beam Size Max. Lbs.
1½	$330.00	$4.20	$365.00	$5.20	7	15.3	24	120
2	330.00	4.20	365.00	5.20	8	18.4	24	120
3	340.00	4.40	375.00	5.40	9	21.8	24	120
4	430.00	4.60	465.00	5.60	10	25.4	24	120
5	515.00	5.00	550.00	6.00	12	31.8	24	120
6	515.00	5.00	550.00	6.00	12	31.8	24	120
8	835.00	5.40	900.00	6.40	15	42.9	24	120
10	975.00	7.40	1040.00	8.40	15	42.9	24	120
12	1300.00	8.40	1400.00	9.40	15	42.9	24	120
16	1710.00	10.80	1800.00	11.80	18	54.7	24	120
20	2000.00	14.80	2100.00	15.80	18	54.7	24	120
24	2065.00	14.80	2200.00	15.80	18	54.7	24	120

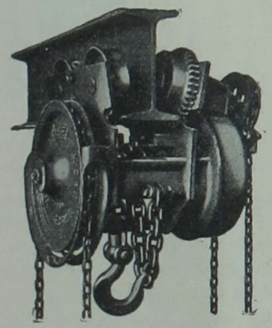
Rated Cap. Long Tons	Travel of Lower Hook or Standard Lift Ft.	Test Load in Long Tons	Chain Pull to Lift Full Load Lbs.	Chain Overhauled to Lift Load 1 Foot in Ft.	Speed Ft. per Min.	Approx. Wt. Lbs. Plain	Approx. Wt. Lbs. Geared
1½	8	2¼	69	56	5.1	275	308
2	9	3	92	56	3.9	325	352
3	10	4½	115	68	2.5	450	477
4	10	6	121	86	1.9	653	683
5	12	7½	92	161	1.4	925	955
6	12	9	110	161	1.2	925	955
8	12	12	130	168	.85	1480	1520
10	12	15	130	242	.65	1880	1920
12	12	18	160	242	.45	1880	1920
16	12	24	150	336	.30	2400	2460
20	12	30	150	484	.20	2750	2820
24	12	36	180	484	.15	2760	2830

Yale Army Type Ball Bearing Spur-Geared Trolley Hoists

This combination gives the shortest head room possible, taking the measurements from the underside of the I-beam to the bearing point of the load hook raised to its highest position. It has made possible the use of a hoist and I-beam trolley system for handling coal and ashes in the basements of schools, buildings, etc.



Plain Type



Geared Type

Plain Type

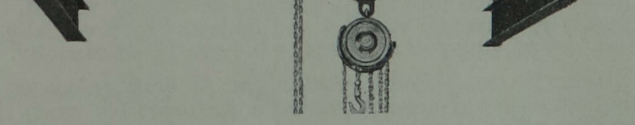
Capacity Tons	Complete Each	Extra Lift per Foot	Std. Size I-Beam Inches	Std. Lift Feet	Min. Distance Between Hook and Beam Inches	Weight Pounds
¼	$117.00	$1.80	5	8	8½	90
½	117.00	1.80	5	8	8½	90
1	149.00	1.90	6	8	10½	145
1½	190.00	2.00	7	8	12	203
2	221.00	2.10	8	9	14¼	286
*3	250.00	2.60	9	10	16¾	390
4	339.00	3.20	10	10	22	500
†5	433.00	4.20	12	12	23	615
†6	535.00	4.20	12	12	23	615
8	785.00	5.40	15	12	38	830
10	940.00	6.50	15	12	40½	1060

Geared Type

1	$183.00	$2.90	6	8	11¾	188
1½	222.00	3.00	7	8	13¼	255
2	254.00	3.10	8	9	16	360
*3	284.00	3.60	9	10	16¾	450
4	383.00	4.20	10	10	22	580
†5	489.00	5.20	12	12	23	705
†6	590.00	5.20	12	12	23	705
8	850.00	6.40	15	12	38	920
10	1010.00	7.50	15	12	40½	1160

*Single strand load chain. †Double strand load chain.

Yale Single I-Beam Hand Traveling Cranes



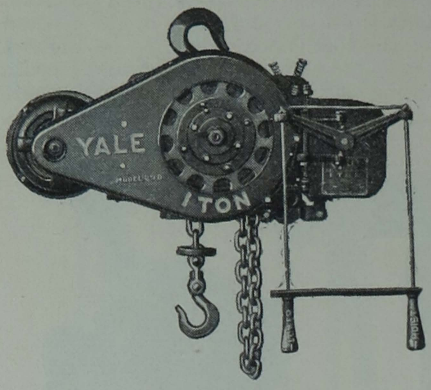
The construction of this crane permits it to be used in places where limited headroom is available. The crane consists of a single I-beam supported at each end on a patented truck frame. The I-beam is of standard size, sufficient for the required capacity and span.

Prices and complete information furnished upon application.

Model 20-B Yale Electric Chain Hoists

Ball Bearing

¼ to 3-Ton Capacity



Hook Type, Manual Control

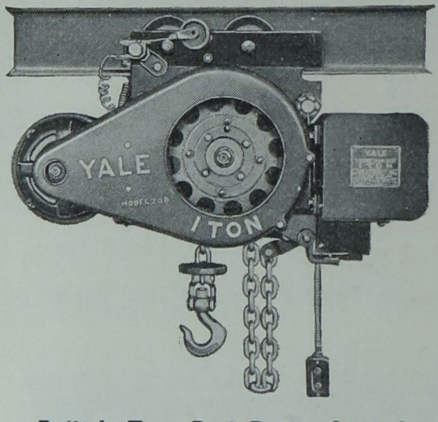
The Yale Electric Chain Hoist incorporates the features necessary to withstand the abuses found in electric hoist service. These units provide a maximum in ruggedness and strength, simplicity in operation and maintenance, standardized interchangeability of parts and high overall efficiency.

Hoist Controllers. The Controllers are of two types, manual, (pendant cord), and push button. The manual (pendant cord) control is cylinder drum type, without resistance, with a spring-return to neutral position. Fingers and contacts are renewable, and unit is equipped with asbestos board arc deflectors of ample area.

The push Button control is magnetic contractor type, interlocked with solenoid motor brake and safety limit stops. It is actuated through a hand grip push button station. Push Button control provides several operation advantages.

Hoist Mechanism. The first reduction from the motor is an enclosed roller chain with steel sprockets having cut teeth. This type of reduction provides a smooth free running drive of high overall efficiency, and safeguards the motor and hoisting mechanism against side strains or common service abuses. The main hoist gearing is a spur gear reduction, balanced planetary type. Gears are mounted on bronze anti-friction bearings, operating on ground steel shafts with milled oil groove. The gear pressure is so balanced that the thrust is diametrically opposed, setting up a minimum of stress and maintaining the initial high gear efficiency. Gears are totally enclosed, operate in oil bath, and are readily accessible by removing the oil-tight gear cover.

Hoist Safety Limit Stops. All hoists are equipped with upper and lower safety limit stops, operating mechanically through interlock with controller.



Built-In Type, Push Button Control

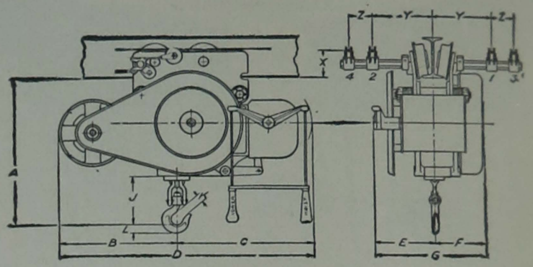
Hoist Bearings. Load sheave on which the suspended load is lifted is mounted in two bearings of high carbon chrome alloy steel. Bearings enclosed with dustproof seal. Lubrication is by oil duct with ball valve dustproof oilers, readily accessible.

Load Chain. Yale chain is made exclusively of steel, rolled to our specifications. Each link is die formed, electrically welded, die forged, heat-treated, tumbled and subjected by a special process to a proving pull in excess of the rated load capacity.

Hoist Brakes. Roller-ratchet type. All brakes mounted on the outer side of unit, providing adjustment for wear, and contact with atmosphere for maximum cooling effect.

Safety Load Hooks. Drop-forged steel, Will open slowly without fracture under severe overload. Provides warning of danger and permits depositing the load without injury to operator, load or the hoist mechanism. Free, easy, and universal movement is provided by swiveling on heavy duty ball bearings and swinging or rocking on a crosshead.

Model 20B Yale Electric Ball Bearing Chain Hoists



Manual Control

Rated Capacity Tons	Dimensions, Inches Trolley Type A	All Types B	C	E	F	**H	J	K
¼ Q.S. and ½	17	15½	18¾	8⅝	7⅜	17	3⅞	1⅛
½ Q.S. and 1	19	17⅜	20⅛	9⅞	8½	22	4½	1 5/16
2	25	16	21½	9⅞	8½	29	13⅛	1 11/16
3	20	17	21⅛	11	9⅝	24	8⅜	2 1/16

Rated Capacity Tons	Dimensions, Inches L	X	Y	Z	I-Beam Inches Std.	Max.	Min. Radius Curve Ft.	Net Weight Trolley Type
¼ Q.S. and ½	⅞	3	*7½	3	5	15	3	300
½ Q.S. and 1	1 3/16	4	*7½	3	6	18	3	490
2	1½	6	*7½	3	8	18	4	585
3	1 15/16	6⅜	9	3	9	18	5	675

Push Button Control

Rated Capacity Tons	Dimensions, Inches Trolley Type A	All Types B	C	E	F	**H	J	K
¼ Q.S. and ½	17	15½	19½	7 7/16	11	17	3⅞	1⅛
½ Q.S. and 1	19	17⅜	20⅝	9 5/16	11 11/16	22	4½	1 5/16
2	25	16	22	9 5/16	11 11/16	29	13⅛	1 11/16
3	20	17	21⅝	11	13	24	8⅜	2 1/16

Rated Capacity Tons	Dimensions, Inches L	X	Y	Z	I-Beam Inches Std.	Max.	Min. Radius Curve Ft.	Net Weight Trolley Type
¼ Q.S. and ½	⅞	3	*7½	3	5	15	3	350
½ Q.S. and 1	1 3/16	4	*7½	3	6	18	3	530
2	1½	6	*7½	3	8	18	4	625
3	1 15/16	6⅜	9	3	9	18	5	715

Hoisting and Lowering Speeds in F.P.M.

Direct Current

Capacity Tons	Motor H.P.	Hoisting No Load	Half Load	Full Load	Lowering No Load	Full Load
¼ Q.S.	¾	80	55	45	80	60
½ A.	¾	36	23	18	36	28
½ Std.	¾	40	26	22	40	30
½ Q.S.	1½	60	40	32	60	45
½ H.S.	2¼	..	..	..	..	..
1 L.S.	1¼	..	..	..	..	..
1 A.	1½	40	25	20	40	30
1 Std.	2¼	54	34	29	54	38
1 Q.S.	3	65	47	38	65	60
2 L.S.	1¼	..	..	..	..	..
2 A.	1½	20	12.5	10	20	15
2 Std.	2 ¼	27	17	15	27	18
2 Q.S.	3	32	13	19	32	30
3 Std.	2 ¼	17	12	10	18	14
3 Q.S.	3	25	16	14	25	17

Alternating Current

Capacity Tons	Motor H.P.	Polyphase Hoisting	Lowering	Single Phase Hoisting No Load	Full Load	Lowering No Load	Full Load
¼ Q.S.	¾	50	54	72	40	72	66
½ A.	¾	16	17	36	20	36	33
½ Std.	¾	24	26	36	20	36	33
½ Q.S.	1½	35	38	54	32	54	45
½ H.S.	2¼	50	55	..	..	..	..
1 L.S.	1¼	13	14	..	..	..	..
1 A.	1½	18	19	36	18	36	28
1 Std.	2¼	26	29	..	..	..	..
1 Q.S.	3	36	40	..	..	..	..
2 L.S.	1¼	6	7	..	..	..	..
2 A.	1½	9	9.5	18	9	18	14
2 Std.	2¼	13	14	..	..	..	..
2 Q.S.	3	18	20	..	..	..	..
3 Std.	2¼	9	10	..	..	..	..
3 Q.S.	3	13	14	..	..	..	..

*On Trolley Type Y equals 9 inches.

**Dimensions of Hook Type.

Q.S. is used as an abbreviation for Quick Speed; H.S. for High Speed; L.S. for Low Speed. A. is abbreviation for Trolley Type A; Std. for Standard Ton.

4 speed direct current and 2 speed alternating current are available.

Model 20B Yale Ball-Bearing Electric Chain Hoists

No. 1, Hook Type—Manual Control

D.C., 110, 220 and 550 Volts
A.C., 2 and 3 Phase, 110, 220, 440 and 550 Volts

Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed	Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed
¼	$264.00	$.75	Quick	1	$422.00	$.84	Quick
½	286.00	.75	Type A	2	435.00	1.41	Type A
½	297.00	.75	Standard	2	463.00	1.41	Standard
½	330.00	.84	Quick	2	493.00	1.41	Quick
½	363.00	.84	High	3	547.00	2.24	Standard
1	383.00	.84	Type A	3	578.00	2.24	Quick
1	394.00	.84	Standard	.	....	....	....

No. 2, Plain Trolley Type—Manual Control

A.C., 2 and 3 Phase, 110, 220, 440 and 550 Volts

Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed	Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed
¼	$275.00	$.75	Quick	1	$444.00	$.84	Quick
½	303.00	.75	Type A	2	462.00	1.41	Type A
½	314.00	.75	Standard	2	491.00	1.41	Standard
½	347.00	.84	Quick	2	517.00	1.41	Quick
½	385.00	.84	High	3	574.00	2.24	Standard
1	405.00	.84	Type A	3	605.00	2.24	Quick
1	416.00	.84	Standard	.	....	....	....

No. 3, Geared Trolley Type—Manual Control

A.C., 2 and 3 Phase, 110, 220, 440 and 550 Volts

Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed	Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed
½	$380.00	$1.50	Quick	2	$499.00	$2.07	Type A
½	418.00	1.50	High	2	524.00	2.07	Standard
1	438.00	1.50	Type A	2	553.00	2.07	Quick
1	460.00	1.50	Standard	3	607.00	2.24	Standard
1	477.00	1.50	Quick	3	638.00	2.24	Quick

No. 4, Motor Driven Trolley Hoist—Manual Control

A.C., 2 and 3 Phase, 110, 220, 440 and 550 Volts

Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed	Cap. Tons	With 16-Ft. Lift Each	Extra Lift per Ft.	Speed
¼	$704.00	$.75	Quick	1	$862.00	$.84	Quick
½	726.00	.75	Type A	2	875.00	1.41	Type A
½	737.00	.75	Standard	2	903.00	1.41	Standard
½	770.00	.84	Quick	2	933.00	1.41	Quick
½	803.00	.84	High	3	987.00	2.24	Standard
1	823.00	.84	Type A	3	1018.00	2.24	Quick
1	834.00	.84	Standard	.	....	....	....

Extra for Single Phase Manual Control, 110 and 220 Volts, 60 Cycle

	No. 1, 2, 3	No. 4			No. 1, 2, 3	No. 4	
¼	$44.00	$99.00	Quick	1	$55.00	$110.00	Type A
½	44.00	99.00	Type A	1	55.00	110.00	Standard
½	44.00	99.00	Standard	2	55.00	110.00	Type A
½	55.00	110.00	Quick	2	55.00	110.00	Standard

Extra for Push Button Control

	No. 1, 2, 3	No. 4			No. 1, 2, 3	No. 4	
¼	$22.00	$44.00	Quick	1	$44.00	$88.00	Quick
½	33.00	66.00	Type A	2	44.00	88.00	Type A
½	33.00	66.00	Standard	2	44.00	88.00	Standard
½	33.00	66.00	Quick	2	44.00	88.00	Quick
½	33.00	66.00	High	3	50.00	100.00	Standard
1	44.00	88.00	Type A	3	50.00	100.00	Quick
1	44.00	88.00	Standard	.	.....	......	....

Extra for Two-Speed Hoist, 220 and 440 Volts, 3 Phase, 60 Cycle, Manual Control

	No. 1, 2, 3, 4			No. 1, 2, 3, 4	
½	$66.00	Quick	2	$66.00	Type A
1	66.00	Type A	2	66.00	Standard
1	66.00	Standard	.	.....	....

Extra for Four-Speed Hoist, 110, 220 and 550 Volts, 60 Cycle, Manual Control

½	$138.00	Quick	2	$138.00	Type A
1	138.00	Type A	2	138.00	Standard
1	138.00	Standard	.	......	....

Twin Hook—3 to 5-Foot Span

D. C., 110, 220 and 550 Volts
A.C., 2 and 3 Phase, 110, 220, 440 and 550 Volts, Manual Control

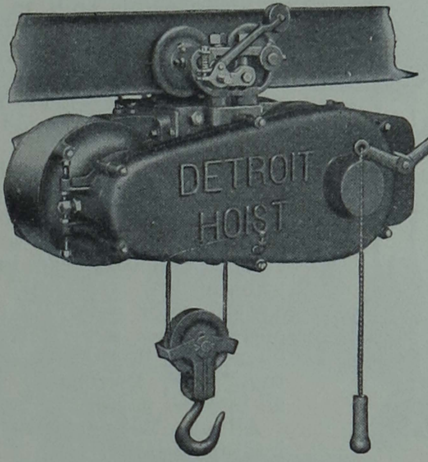
Capacity..............tons	½	1	2
Speed....................	Quick	Standard	Standard
Hook Type............each	$649.00	$682.00	$798.00
Extra Lift..........per ft.	1.41	1.41	2.55
Extra Span.........per ft.	7.00	7.00	7.00
Push Button Control....add	33.00	44.00	44.00

Prices with hand or motor driven trolleys in the twin hook model upon application.

Prices for Nos. 1, 2, 3 and 4 include current collectors and chain containers.

Type M Detroit Electric Hoists

Trolley Type



This electric hoist has heavy split malleable frame, accessibly mounting all parts. Rugged, efficient, over-sized, crane type motor.

Simple and adjustable, jaw-type, motor brake, operated by control lever.

High grade, silent chain drive, running in oil on hardened sprockets. Factor of strength over 60. Guaranteed to outwear the life of the hoist. Simple, quiet and efficient transmission. Same as used in practically all high grade automobiles for timing gears, etc.

Silent, non-adjustable, steel pawl with case-hardened tip. Simple, self-adjustable, 3-piece load brake, running in oil. Over 50 square inches braking area.

A real drum type, fully enclosed controller with heavy mechanical parts and oversized electrical contacts. Copper contacts ½ inch wide, reversible and renewable.

Wide grooved drum, 7 inches in diameter, taking standard lift in grooves. Cable is easily attached. Simply snapped into slot. No special tools required.

Two pairs coarse pitch spur gears, forged steel, running in oil.

All parts designed for accessibility, e.g., 2 screws remove rear gear case exposing all gears.

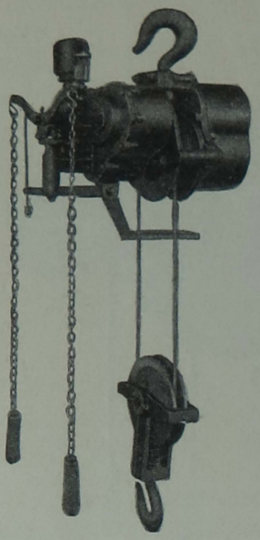
Wiring in rigid, compactly fitted conduit; no loose dangling wires in loom.

Built in one frame size with a range of capacities ¼ to 3 tons. Furnished rope or pendent control and for all standard currents, a.c. or d.c.

No.	Each	Capacity Pounds	Hoisting Speed per Min.	Std. Ht. Lift Feet	Head Room In.	Approx. Weight Pounds
M-2	$550.00	500	70	11	15	490
M-3	580.00	1000	35	11	15	490
M-4	580.00	1500	24	11	15	490
M-5	690.00	2000	19	11	15	490
M-6	730.00	1500	35	11	15	515
M-7	730.00	2000	28	11	15	515
M-8	780.00	3000	19	11	16	550
M-9	880.00	4000	16	11	16	550
M-10	950.00	5000	16	10	21	600
M-12	1060.00	6000	19	10	21	650

Other types, capacities ½ to 10 tons also available. Prices and further information upon request.

Detroit Geared Pneumatic Hoists



A simple, portable hoisting machine designed for lifting, lowering and handling loads by compressed air. It will operate by steam.

This hoist is built in a range of capacities from ½ to 10 tons.

The nominal working pressure is 80 pounds per square inch, but the motor will work at a lower or higher pressure at a correspondingly slower or faster speed.

The hoist is controlled by a self-centering valve lever, with hand lines hanging convenient to operator. An upstop is provided to automatically stop motor in case load is lifted too high.

The motor runs in a bath of oil and is further lubricated by external oiler on air intake. Gearing runs in tight case, thoroughly lubricating all internal parts.

All essential parts are jigged and interchangeable.

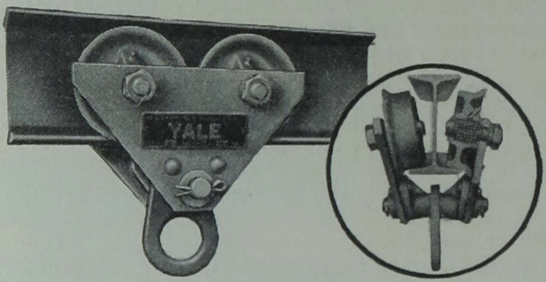
Capacities and Dimensions

Size No.	Cap. in Tons	Speed Lift in Ft. per Min.	Standard Height Lift Ft.	Max. Lift Ft.	Strands Cable	Approx. Cu. Ft. Free Air per Ft. Lift	Approx. Wt. Lbs.
1A	½	40–50	20	60	1	1½	230
1	1	25–30	20	40	1	3	230
2	1½	18–20	10	20	2	4	250
3	2	12–14	10	20	2	6	250
4	3	9–10	10	22	2	8	285
5	4	10–12	10	25	2	12	590
5	5	9–10	12	25	2	15	590
6	6	8–9	12	50	4	19	740
7	8	5–6	12	35	4	25	925
8	10	4–5	12	35	4	27	1000

Prices upon application.

Model H Yale Roller Bearing Steel Trolleys

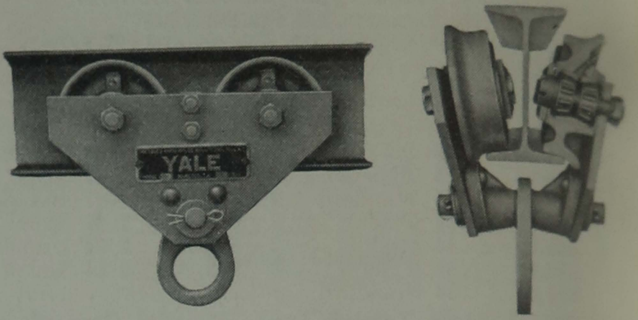
Plain Type



Constructed in 2 complete units, each side being an assembly consisting of the trolley side plate, wheels, axles, and bearings. The plane of the wheels is perpendicular to the flanges of the I-beam track so that the lines of force due to the load intersect at the point of suspension in the eye of the clevis and the load is at all times equally distributed over the 4 wheels. Large diameter wheels with cylindrical chilled tread. The equalizing pin, which connects the 2 trolley halves, may be easily removed, enabling the trolley to be taken from the track at any point or widened for larger beams. Carbon steel axles hardened and ground to a tolerance of .0005 in. Hyatt roller bearings. Alemite-Zerk high pressure lubrication. Drop-forged steel clevis suspended from the equalizing pin.

Capacity Tons	Each	Adjustment for I-Beams	Smallest Radius for Curve Inches	Diameter of Tread of Wheels Inches	Direct Push to Start Fully Loaded Trolley Pounds	Weight Lbs.
¼	**$28.00**	4–5–6–7	18	3	9	17
½	**30.00**	5–6–7–8	21	3¾	12	27
1	**35.00**	6–7–8–9	21	4¾	25	43
1½	**45.00**	7–8–9–10	30	5½	33	72
2	**58.00**	8–9–10–12	36	6½	42	93
3	**75.00**	9–10–12–15	42	7¼	60	145
4	**103.00**	10–12–15–18	48	8¼	80	160
5	**133.00**	12–15–18–20	54	10	90	268

Model T Yale Steel Plate Roller-Bearing Trolleys



Trolley constructed in two complete units, each side being an assembly consisting of the trolley side plate, wheels, axles, and bearings. The two trolley halves are connected by an equalizing pin. This flexibility provides an equalized load, facilitating operation on small radius curves, over track joint or other track irregularities. The plane of the wheels is perpendicular to the flanges of the I-beam track, so that the lines of force due to the load intersect at the point of suspension in the eye of the clevis, and the load is at all times equally distributed over the four wheels.

Wheels are of large diameter, with cylindrical chilled tread, designed to provide a perfect rolling motion, with a minimum of wear on wheels and track. Provided with specially curved flanges, to avoid grinding and cramping on curves.

Equalizing pin may be easily removed, enabling the trolley to be taken from the track at any point, or widened for larger beams. All parts are carefully tested.

Axles are of carbon steel with an adjusting nut on the inner ends for adjusting clearances on opposed Timken tapered roller bearings. Trolley is equipped with eight adjustable Timken tapered roller bearings—two in each wheel, designed and made to take radial and thrust loads.

Lubrication is by Alemite-Zerk high-pressure fitting.

Clevis is drop-forged steel up to 2-ton size, and a heavy steel plate on the larger sizes, and is suspended from equalizing pin. All parts in suspension are of steel.

Cap. Tons	Adjustable for I-Beams	Greatest Distance Between Supports Ft.	Smallest Radius for Curve In.	Diam. Tread of Wheel In.	Net Weight Pounds Plain	Net Weight Pounds Geared
¼	4–5–6–7	10	18	3	17	...
½	5–6–7–8	14	21	3¾	27	...
1	6–7–8–9	14	21	4¾	53	78
1½	7–8–9–10	15	30	5½	71	103
2	8–9–10–12	16	36	6½	105	148
3	9–10–12–15	16	42	7¼	147	194
4	10–12–15–18	16	48	8¼	202	255
5	12–15–18–20	18	54	10	265	329
6	12–15–18–20–24	16	60	10	311	378
8	15–18–20–24	18	60	12	472	514
10	15–18–20–24	15	60	13	587	645

Plain Type

Cap. Tons	Each	Direct Push to Move Fully Loaded Trolley, Pounds	Cap. Tons	Each	Direct Push to Move Fully Loaded Trolley, Lbs.
¼	**$28.00**	5	**3**	**$75.00**	26
½	**30.00**	7	**4**	**103.00**	33
1	**35.00**	11	**5**	**133.00**	40
1½	**45.00**	15	**6**	**170.00**	47
2	**58.00**	20	**8**	**225.00**	60

Geared Type

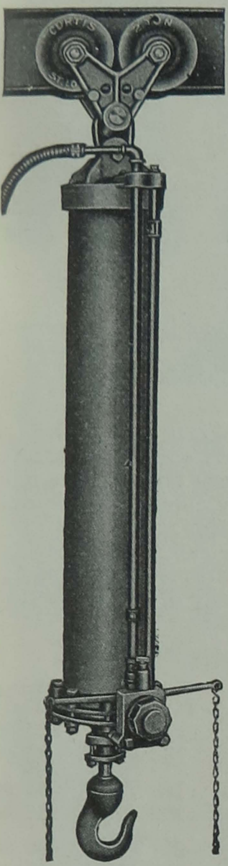
Cap. Tons	Each	*Standard Reach of Hand Chain Ft.	*Standard Reach of Hand Chain In.	Pull to Move Load, Lbs.	Cap. Tons	Each	*Standard Reach of Hand Chain Ft.	*Standard Reach of Hand Chain In.	Pull to Move Load, Lbs.
1	**$70.00**	8	8	7	**4**	**$168.00**	12	6	14
1½	**87.00**	9	.	7	**6**	**255.00**	15	5	20
3	**130.00**	12	3	11	**10**	**440.00**	16	9	32

*Standard reach of hand chain from under side of I-beam.

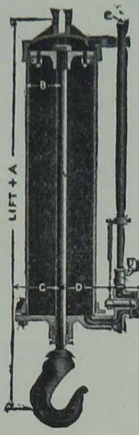
Extra hand chain for geared trolleys......per foot $.50

Trolleys to fit on larger sizes I-beams than specified, prices upon application.

Curtis Pendant Type Air Hoists
Classes A and G



Pendant Air Hoist



The design of the various types of Curtis Air Hoists has been made to secure strength, durability, lightness, safety, dependability, low maintenance cost, accessibility of all working parts and the best possible speed control.

LENGTH.—Minimum; bracketed horizontal hoists recommended for limited head-room.

PRESSURES.—Up to 110 pounds.

CAPACITIES.—Up to 20000 pounds at 80 pounds air pressure. Make allowance for 10 per cent air pressure drop.

VALVE.—The Curtis patented packless hoist valve is of disc type, self-grinding, and perfectly tight.

CYLINDERS.—Steel tubing, ground and polished on inside.

CYLINDER HEADS.—Plate steel upper heads or rear heads, also lower rings, welded to cylinder up to 8-inch diameter inclusive. Cast steel upper or rear head and lower ring screwed to cylinder 9-inch diameter and larger. Lower head is bolted to lower ring, the joint being made tight by metallic packing so that it is not necessary to take down hoist since the piston can readily be removed or cup leather renewed by simply unbolting the head from the ring without dismantling the hoist. The stuffing boxes are unusually long.

PISTON LEATHERS.—Hydraulic leather. Air tight.

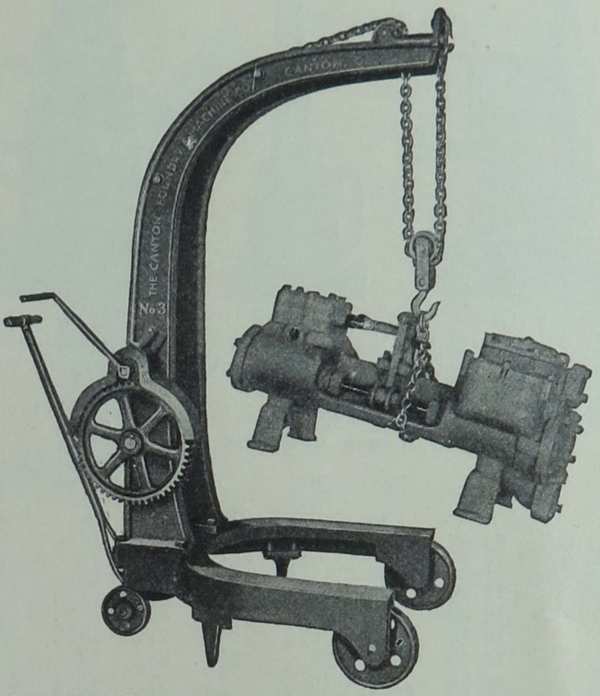
Nominal I. D. Hoist, In.	**Cap. Lbs. at 80 Lbs. Air Pressure (Std. Rod)	Cu. Ft. Air Reqd. to Lift Max. Ld. 1 Ft. at 80 Lb. Pres.	Shipping Wt., Lbs. with 4-Ft. Lift	Shipping Wt., Lbs. Each Add'l. Foot
4	860	.54	105	20
5	1370	.85	150	30
6	1960	1.22	200	36
7	2700	1.73	240	40
8	3510	2.24	300	48
9	4470	2.85	360	55
10	5500	3.29	420	65
12	7990	5.06	580	80
14	10870	7.13	850	100
17	16080	10.10	1200	120
19	20150	12.50	1500	150

Nominal I.D. Hoist, In.	DIMENSIONS, INCHES A	B	C	D	*E
4	16 7/8	2 3/16	3 1/2	9	1/2
5	16 7/8	2 3/4	4	9 1/2	1/2
6	19 11/16	3 5/16	4 5/8	10 1/8	1/2
7	20 1/16	3 13/16	5 3/16	11 3/8	3/4
8	22 5/8	4 5/16	5 11/16	11 7/8	3/4
9	22 7/8	4 13/16	6 7/16	12 5/8	3/4
10	25 5/8	5 3/8	7	13 1/8	3/4
12	25 7/8	6 3/8	8 1/8	14 3/4	1
14	29 7/8	7 1/2	9 11/16	16 1/2	1
17	30 3/4	9	11 1/8	18 1/2	1 1/4
19	31 1/4	10	12	19 1/2	1 1/4

*Nominal inside diameter of pipe.

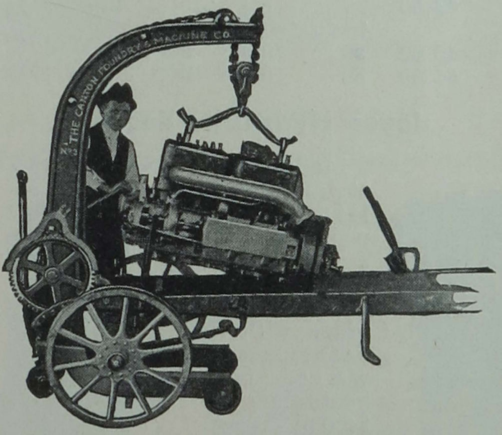
**Ten per cent allowed for friction.

Portable Floor Cranes and Hoists



No. 3 High Base Crane in Operation Lifting Steam Pump

Made of a combination of semi-steel and steel. Equipped with Hyatt roller-bearings for ease of operation and guaranteed tested chain.



No. 3 Low Base Crane in Operation

Easily operated, and can be moved to most remote parts of the shop by one man.

Nos. 2, 3 and 4 are best sizes for average shop work.

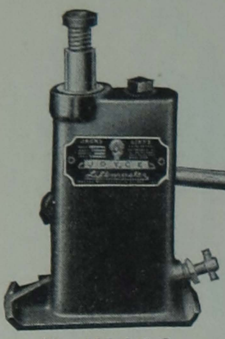
Select the crane by dimensions. Be sure it has sufficient lift for the work. By lift is meant distance from floor to hook when hook is at highest point.

Canton Cranes in any size can now be furnished with safety friction load brake at an additional charge of $50.00 to prices quoted below.

No.	Each	Total Height Ft.	Lift Ft.	WIDTH, BED Out-side	In-side	Size Bed Inches	Cap. Lbs.	Wt. Lbs.
1	**$125.00**	5 2/3	4 1/2	29	22	35x 9	2000	600
2	**137.50**	6 1/2	5 1/3	32	25	38x12	3000	850
3	**150.00**	7 1/2	6 1/3	34	28	45x12	4000	1150
4	**175.00**	8 1/2	7 1/3	40	32	48x12	5000	1300
5	**200.00**	9 1/2	8 1/4	44	36	51x12	6000	1400
6	**212.00**	10 1/2	9 1/4	48	40	54x12	6000	1700
7	**250.00**	11 1/2	10 1/4	53	44	57x12	6000	2000
8	**275.00**	12 1/2	11 1/4	58 1/2	49 1/2	61x12	6000	2225

Nos. 2, 3, 4 and 5 hoists furnished with low beds 6 3/4 inches high at same price. In ordering, state whether high or low bed is wanted.

Joyce Liftmaster Hydraulic Jacks


No. JM-1.5-S

No. B-7-S

No. T-12

Especially effective in close quarters. One-piece body construction—sled type base and convenient carrying handle.

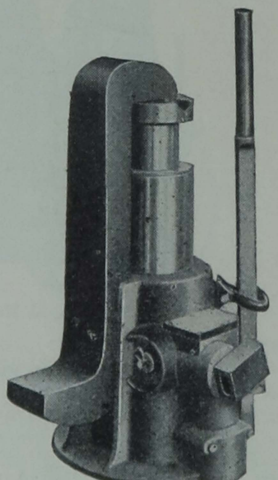
With 36-inch 2-piece handle which locks onto pump lever.

Auto, Truck and Bus Models

No.	Each	Capacity Tons	Low Height In.	Lift In.	Extension In.	Total Height In.	Weight Lbs. with Handle
JM-1.5-S	**$3.95**	1½	6¾	5	3	14¾	9¾
JM-2-ST	**7.50**	2	7¾	5¼	2	15	12
T-2.5-S	**11.50**	2½	8	6	3	17	16¼
T-4.5-S	**14.00**	4½	9	5¾	2½	17¼	20
T-7	**18.50**	7	8⅝	5½	...	14⅛	25
T-7-S	**18.50**	7	9	5½	2½	17	24
T-12	**26.50**	12	10⅛	6¾	...	16⅞	38
T-12-S	**26.50**	12	10½	6¾	3½	20¾	38½
LT-12-S	**26.50**	12	8	5	2½	15½	34½
MT-12-S	**26.50**	12	9	6	3½	18½	37¼
B-4.5	**35.00**	4½	7⅛	8	...	15⅛	33
B-7-S	**40.00**	7	7⅝	8	2¼	17⅞	33
HB-7-S	**42.00**	7	8½	10½	2¼	21¼	20
Industrial Models							
T-20	**45.00**	20	10¾	6¾	...	17½	55
T-30	**66.00**	30	10¾	6¾	...	17½	65

Joyce Hydraulic Jacks

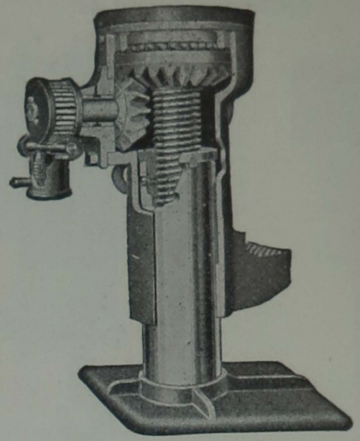
A
Ground Lift


B
Outside Pump with Hook

Made in 2 styles, ground lift inside pump jacks and outside pump jacks. Jacks provided with a safety vent, which prevents the ram from being pumped out beyond the safe limits. Jacks can be operated in either vertical or horizontal positions. Can be equipped for pressure gauge attachment at an additional net cost of approximately $35.00 The auxiliary hook is not furnished with the outside pump jack unless ordered. Capacity of ground lift is ½ rated or head capacity.

No.	Capacity Tons	Rise Inches	Height Inches	Weight Pounds	Price Each	Price Extra for Hook
2012A	20	12	25	204	**$165.00**	.....
2018A	20	18	33	215	**181.00**	.....
3012A	30	12	26	267	**225.00**	.....
3018A	30	18	33	335	**239.00**	.....
6012A	60	12	27	332	**345.00**	.....
3012B	30	12	20	241	**234.00**	**$23.00**
3018B	30	18	25	259	**253.00**	**25.00**
6012B	60	12	20	305	**367.00**	**33.00**
6018B	60	18	26	370	**456.00**	**35.00**
10012B	100	12	22	495	**487.00**	**40.00**
10018B	100	18	29	596	**588.00**	**51.00**

Joyce Geared Screw Jacks

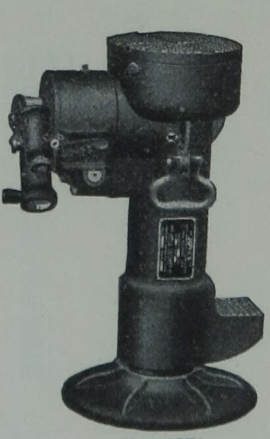


Used principally for heavy contracting work, bridge building, car and locomotive repair work, ship building, etc. Screw runs in a bronze nut, which reduces friction to a minimum. Geared screw jacks are highly efficient for there is no lost motion. They have a positive stop. Run in oil. All working parts are removable through cap. Ball bearings and bearing plates are from highest alloy steel. Capacity of foot lift is one-half capacity of head lift given below. Furnished standard with rectangular base.

No.	Capacity Head Lift Tons	Height Inches	Rise Inches	Weight Pounds	Price Each
154A	25	22	12	119	**$90.00**
155A	25	26	16	133	**96.00**
158A	35	22	12	180	**130.00**
160A	35	27	17	208	**138.00**
165A	50	26	16	267	**150.00**
170A	75	27	16	380	**200.00**

Joyce Ball Bearing Geared Screw, High Speed Self-Lowering Jacks

Upright Style


No. 1278
With Foot

This jack has an all-steel construction, bronze bushings at every bearing point, and the mechanism runs in an oil bath which insures constant lubrication and practically eliminates wear on the working parts.

Furnished in either plain locomotive style or with foot.

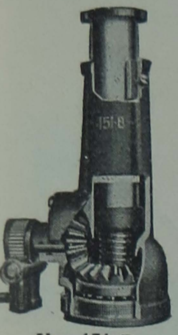
This jack lowers the load without exertion by pressing the reversing lever at the side of the jack.

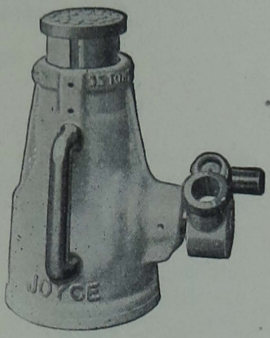
On account of the pitch of the screw the load runs down due to the weight but is controlled by a series of worms and worm gears and can be stopped at any desired point by releasing the pressure on the reversing lever.

Capacity of foot is ½ rated or head capacity.

No.	**1278**	**1279**	**1288**	**1289**	1299
Plain........each	**$210.00**	**$210.00**	**$285.00**	**$285.00**	.....
With Foot...each	**225.00**	**225.00**	**305.00**	**305.00**	**$310.00**
Capacity....tons	50	50	75	75	100
Height........in.	24	26	24	26	26
Rise..........in.	13	15	10	12	12
Weight.......lbs.	270	280	250	350	398

Joyce Ball-Bearing Journal Jacks


No. 151-B


No. 1025

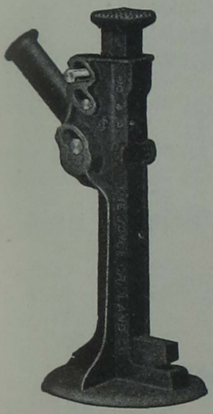
Used in connection with the inspection and rebrassing of journals.

The screw turns in a bronze nut and the ratchet case is completely enclosed to protect the parts. The positive stop prevents the ram from running beyond safety limits. Has fine tooth ratchet.

Nos. 1015-A, 1025-A and 1035-A are constructed with special heat treated aluminum alloy frames and base plates.

Jack No.	Each	Capacity Tons	Height Inches	Rise Inches	Weight Pounds
1015	$25.00	15	10	5	36
1025	36.00	25	10	5	36
151-B	45.00	25	14	8	25
1035	55.00	35	10	5	42
153-J	95.00	50	10	4¼	69
1015-A	32.00	15	10	5	25
1025-A	45.00	25	10	5	25
1035-A	65.00	35	10	5	35

Joyce Plain Lever Mine Trip Jacks

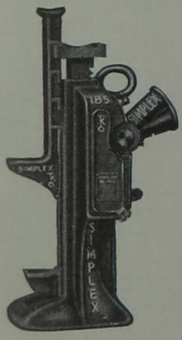


Used extensively for mine work as coal dust will not interfere with working parts. Consists of four parts: Frame, bar, pawl, and lever trunnion. Lowers notch by notch when under load, or trips instantly when free. In M Series, lug has been eliminated and pawl pin extended to prevent finger pinching.

No.	Each	Cap. Tons	Ht. In.	Rise In.	Wt. Lbs.
1-AM	$12.00	2	16	8	28
2-AM	12.00	3	18	10	30
4-AM	15.00	4	19	10	39
4-F	34.00	4	36	30	55
4-M	17.00	5	22	13	46
10-AM	24.00	10	23	12	66
10	24.00	10	27	16	76
6	30.00	15	27	14	95

Simplex Industrial and Mine Jacks

Single Acting—Automatic Raising and Lowering


No. 185

5-ton jack. Recommended for moving machinery, contractors, mining, and motor trucks.

The No. 185 is a more rugged and faster operating jack for heavier duty. Double socket and adjustable drop-forged shoe, with 4 adjustments, provides a wider range of service. When the auxiliary cap shoe is desired, add $1.00 to the list.

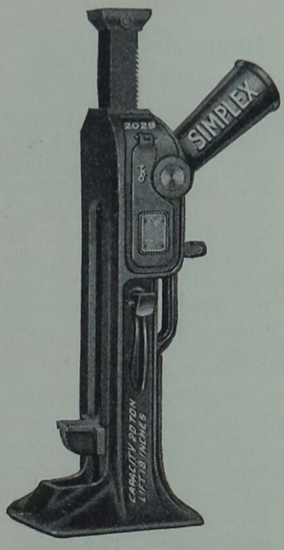
Furnished with 30-inch chisel-pointed heat-treated steel lever bar.

No.	Each	Height Inches	Lift Inches	Weight Lbs.
84	$15.00	14	7½	21
85	16.00	17	10½	25
86	18.00	20¼	13¼	31
185	16.00	16½	9¾	36

We are as near as your nearest telephone.

Simplex Industrial and Car Jacks

Single Acting—Automatic Raising and Lowering


No. 2029

Awarded the Gold Medal of the American Museum of Safety.

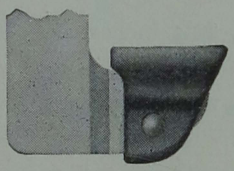
No. 22 furnished with a 5-foot heat-treated steel level bar.

Nos. 24 and 29 furnished with oval or round sockets and 6-foot oval or round hickory lever poles, or with square sockets for lining bars. Oval poles are stronger because of the greater cross-sectional area and because they cannot be inserted across the grain.

Lining bar prices upon application.

No.	22	24	29	*2029
Each	$25.00	38.00	40.00	45.00
Capacity ...tons	10	15	15	20
Height ...inches	21¼	23¾	28½	28½
Lift ...inches	12	13	19	18
Weight ...pounds	59	86	98	100

*With oval socket and 6-foot oval hickory pole only.

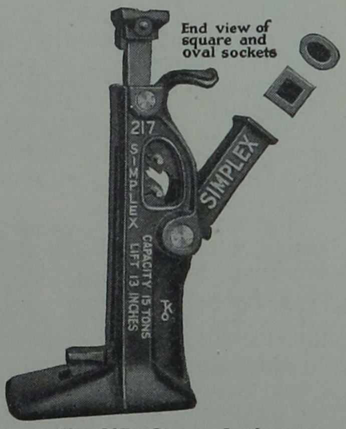

Auxiliary Shoe

An auxiliary shoe, with broad lifting face, 3x5 inches, is recommended for handling wooden sticks. Can be attached to Nos. 22, 24, 29 and 2029 Simplex Jacks.

Add $2.00 additional to list of jacks.

Simplex Track Jacks

Tripping Type—Single and Double Acting



No. 217—Single Acting

15-ton tripping type. Designed for track maintenance and construction. The manually operated safety trip controls the tripping of the load.

Built with high carbon and alloy steel heat-treated working parts, large base areas, and safety lugs underneath the caps. The jack housing where the toe-lift bears is hardened by Electriding, which reduces wear.

The Nos. 101 and 106, double acting, operate on both the upward and downward stroke of the lever bar, identical except for height and lift.

The Nos. 215, 216, 217 and 218 are single acting, and are identical except for height and lift. Built with a compression coil spring squarely in back of the retaining pawl, which forces it into tooth-engagement with a sharp click, a safety feature.

The No. 215 is the modern type of track jack and is used effectively for both track surfacing and lining.

Maximum man-power is developed by specifying square lever sockets and using steel lining bars. When oval or round sockets with oval or round hickory poles are desired, add $1.00 to list. Lining bar prices upon application.

No.	101	106	215	216	217	218
Each	$21.00	27.00	19.00	19.00	21.00	27.00
Height..inches	22½	29	10½	17	23	29
Lift.....inches	13	18	5	8	13	18
Weight.....lbs.	59	78	40	51	59	74

No. 310 Simplex Emergency Jacks

Automatic Lowering—Single Acting

SIMPLEX
310
310
SIMPLEX
SIMPLEX

For general purpose lifting, pulling and skidding. A vertical jack. By unlocking the base hook, it may be tilted to the desired angle. The standardized Simplex automatic lowering mechanism insures safety, man-power and ruggedness.

The double lever socket permits operation in close and cramped quarters. The rotating cap is recessed to firmly hold the auxiliary cap-shoe or any link of the chain.

The equipment consists of an auxiliary cap-shoe, steel drop-forging, a 5-foot BBB chain, and a 5-foot steel heat-treated lever bar.

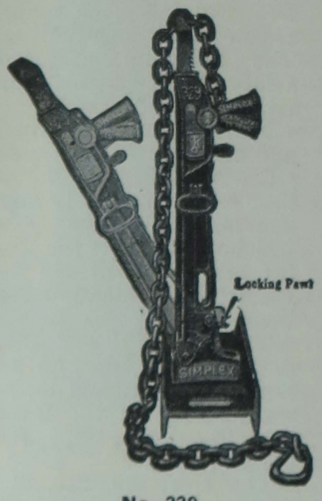
If complete equipment is not required, deduct from the price, $5.50 for chain, $4.50 for shoe, and $2.00 for lever bar.

Capacity of jack, 15 tons. Height, 22¼ inches, lift, 13 inches.

Weight of jack, 66 pounds; complete with equipment, 102 pounds.

No. **310**......................................each **$48.00**

Simplex Pole Pulling and Pole Straightening Jacks



No. 329

For pulling or straightening telephone, telegraph, electric power and trolley poles quickly, without digging, and regardless of size or depth in the ground.

One or two men can pull or straighten poles, pull butts, or move loaded poles without interrupting service.

Nos. 325 and 329 are single acting, automatic raising and lowering. No. 318 has a tripping type mechanism.

No. 325 is a 5-ton jack, light, and durable, for pulling 25 and 30-foot poles, straightening poles of any size, and for tightening guy lines. No. 329 designed for heavier poles.

Standard equipment of the No. 325: a 4-foot steel pinch bar lever; 5-foot steel chain; portable 8x15 inches steel channel base; 8-foot pike pole, equipped with a malleable iron forked cap for biting into wood for straightening poles. Standard equipment of the Nos. 318 and 329: an 8-foot scarf-welded BBB steel chain, fitted with pear-shaped link; a 10x24 inches I-beam base with hand hole; and a 5-foot steel lever bar.

No.	325	318	329
Each	$45.00	62.50	70.00
Capacity.....tons	5	15	15
Height.....inches	48	39	37½
Lift.....inches	37	24	21
Weight of Jack.....pounds	33	90	96
Weight Complete.....pounds	100	187	193

Simplex Cable Reel Jacks

Automatic Raising and Lowering

No. 321

No. 322

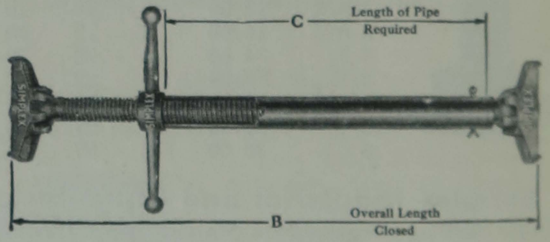
Nos. 320 and 321 are recommended for warehouse service in handling cable, wire rope and belting reels. No. 320 is single acting for reels from 20 to 60 inches in diameter. No. 321 is single acting for reels from 20 to 96 inches in diameter.

No. 322 is generally used for heavy outdoor service. It is double acting and is built for cable reels ranging from 36 to 84 inches in diameter. The T-shaped base provides a firm foundation. The braces are adjustable. Furnished in pairs, one right and one left hand, for uniform operation on the same side of the reel.

Furnished with heat-treated steel lever bars.

No.	320	321	322
Each	$35.00	50.00	65.00
Capacity.....tons	5	10	10
Height.....inches	21	34½	29
Lift.....inches	11	14½	14
Length of Lever.....inches	30	48	48
Weight.....pounds	46	108	104

Simplex Drop Forged Steel Trench and Timber Braces



Complete with Pipe

Drop-forged steel construction insures safe bracing on all trench work. Ball and socket joints at each end permit quick adjustment and tight gripping at all angles. The ball-ends on the lever nuts prevent injuries.

Braces can be adopted to any width by using proper length of pipe. For operation in close quarters where a lever nut cannot be used handily, the Simplex unbreakable 3-way nut is recommended. This special nut can be substituted for the regular lever nut at no extra charge.

No.	Each	Pipe and Screw Diam. Inches	A Length of Screw Inches	B Length of Brace Closed Inches	C Length of Pipe Inches	Safe Extension of Screw Inches	Wt. per Doz. with Pipe Pounds
1	$46.00	1½	10	16	8½	6	190
2	46.00	1½	12	18	10½	7	198
3	48.00	1½	14	21	13½	9	215
4	48.00	1½	14	24	16½	9	224
5	52.00	1½	16	27	19½	10	240
6	52.00	1½	16	30	22½	10	246
7	54.00	1½	18	36	28½	11	270
8	56.00	1½	18	42	34½	11	285
9	58.00	1½	18	48	40½	10	300
10	102.00	2	18	36	26	10	517
11	104.00	2	18	42	32	10	538
12	106.00	2	18	48	38	10	560
13	108.00	2	18	54	44	10	590
14	110.00	2	18	60	50	10	604

Simplex Ball Bearing Screw Jacks

4-Way Head Type

SIMPLEX
CHICAGO
2X12

This jack requires 88% less manpower than common jack screws because 88% of the friction has been eliminated.

Built with a chrome molybdenum steel ball, nested in a hardened nickel steel ball-seat. The heat-treated, drop-forged steel cap is unbreakable.

Will not twist under a load.

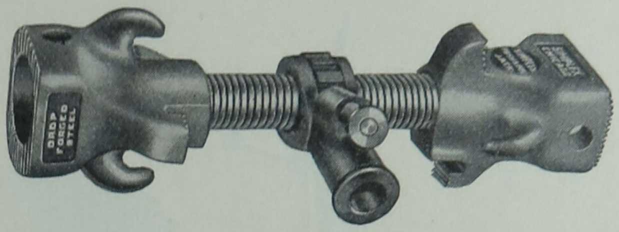
The base with the open hand hole allows seeing how far the screw can safely be run out. Base built overstrong. Solid base, optional.

Simplex high carbon steel, heat-treated, chisel-pointed lever bars are extra strong.

Size Inches	Jacks Each	Chisel-Pointed Heat-Treated Lever Bars Each	Height Closed Inches	Operable Rise of Screw Inches	Lifting Cap. Tons	Man Power Required to Lift Cap. Lbs.	Jack Weight Lbs.
*1x6	$2.60	....	8¾	4½	5	110	5
1¼x4	2.90	$.60	8	2	10	162	9
1¼x6	3.10	.60	9¾	4	10	162	10
1¼x8	3.40	.60	12	6	10	162	12
1¼x10	3.80	.60	14	8	10	162	15
1¼x12	4.20	.60	16	10	10	162	18
1½x4	3.25	.80	8	2	12	192	9
1½x6	3.75	.80	10¼	3¾	12	192	10
1½x8	4.25	.80	12¼	5¾	12	192	14
1½x10	4.75	.80	14¼	7¾	12	192	17
1½x12	5.25	.80	16¼	9¾	12	192	21
1½x14	6.00	.80	18¼	11¾	12	192	26
1¾x6	4.50	1.00	10¼	3¼	16	248	17
1¾x8	5.00	1.00	12¼	5¼	16	248	18
1¾x10	5.75	1.00	14¼	7¼	16	248	22
1¾x12	6.25	1.00	16¼	9¼	16	248	26
1¾x14	6.75	1.00	18¼	11¼	16	248	30
1¾x16	7.50	1.00	20¼	13¼	16	248	36
2x5	5.00	1.60	9¼	2	20	258	17
2x6	5.25	1.60	10½	3	20	258	21
2x8	6.00	1.60	12¼	5	20	258	22
2x10	6.75	1.60	14¼	7	20	258	25
2x12	7.50	1.60	16¼	9	20	258	30
2x14	8.25	1.60	18¼	11	20	258	36
2x16	9.25	1.60	20¼	13	20	258	39
2x18	10.25	1.60	22¼	15	20	258	44
2½x6	7.75	2.40	11	3	24	335	29
2½x8	8.75	2.40	13	4¼	24	335	33
2½x10	9.75	2.40	15	6¼	24	335	38
2½x12	10.75	2.40	17	8¼	24	335	44
2½x14	12.00	2.40	19	10¼	24	335	51
2½x16	13.25	2.40	21	12¼	24	335	55
2½x18	14.50	2.40	23	14¼	24	335	64
2½x20	15.75	2.40	25	16¼	24	335	70
3x8	17.50	3.20	13½	3½	30	417	49
3x14	19.50	3.20	19½	9½	30	417	65
3x18	22.00	3.20	23½	13½	30	417	83
3x24	25.75	3.20	29¾	19½	30	417	111

*A lever bar is included in the price of this jack.

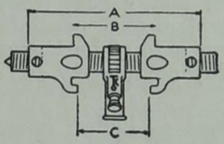
600 Series Simplex Push and Pull Jacks



This jack and its equipment performs six fundamental jacking operations, each of which has innumerable applications. For general purpose maintenance for: mill wrights, industries, machine shops, repair shops, structural work, welding, fleet owners and for maintaining road and contractors' equipment.

Light but strong, capacity, 10 tons. The 6 interchangeable screw lengths provide travel range. The 1¼-inch screw is 1045 heat-treated steel. The nuts are heat-treated steel drop forgings.

Pushing: by inserting any length of standard 1½-inch pipe in either or both well-ends of the nuts. Pushing out grader frames, steel tanks, sway back ridge poles and all types of structural work.



Pulling: the heat-treated chrome nickel sky hooks engage any link of the ½-inch special chains. This centralized pull is recommended for reverse operations to those shown under No. 1, and also for pulling crawler tracks together.

Spreading: Note B in the illustration. The minimum of all the jacks is 3½ inches.

Clamping: Note C in the illustration welding.

Lifting: The drop-forged 3-way base snaps firmly on the jack. The 6-pitch thread and the ratchet mechanism produce power and operable accessibility.

Pulling wheels and gears: the chains snugly nest in the 3 points of the 3-way base. The hardened conical point is centered in the shaft after the nut on that end has been removed. The grab hooks on the end of each chain are used with spoke wheels. The drop-forged and heat-treated stud links are used for pulling brake drums or wherever there are stud bolts. Grab claws are easily rigged up for pulling off motor or solid pulleys.

No.	Each	Length Screw Inches	A Max. In.	A Min. In.	B Max. In.	B Min. In.	C Max. In.	C Min. In.	Wt. Lbs.
610	**$15.00**	10	14	9¼	8¼	3½	7½	2¾	11
612	**15.50**	12	16	9¼	10¼	3½	9½	2¾	12
614	**16.00**	14	18	9¼	12¼	3½	11½	2¾	13
616	**16.50**	16	20	9¼	14¼	3½	13½	2¾	14
618	**17.00**	18	22	9¼	16¼	3½	15½	2¾	15

Special Maintenance Sets

A special maintenance set consists of the following:

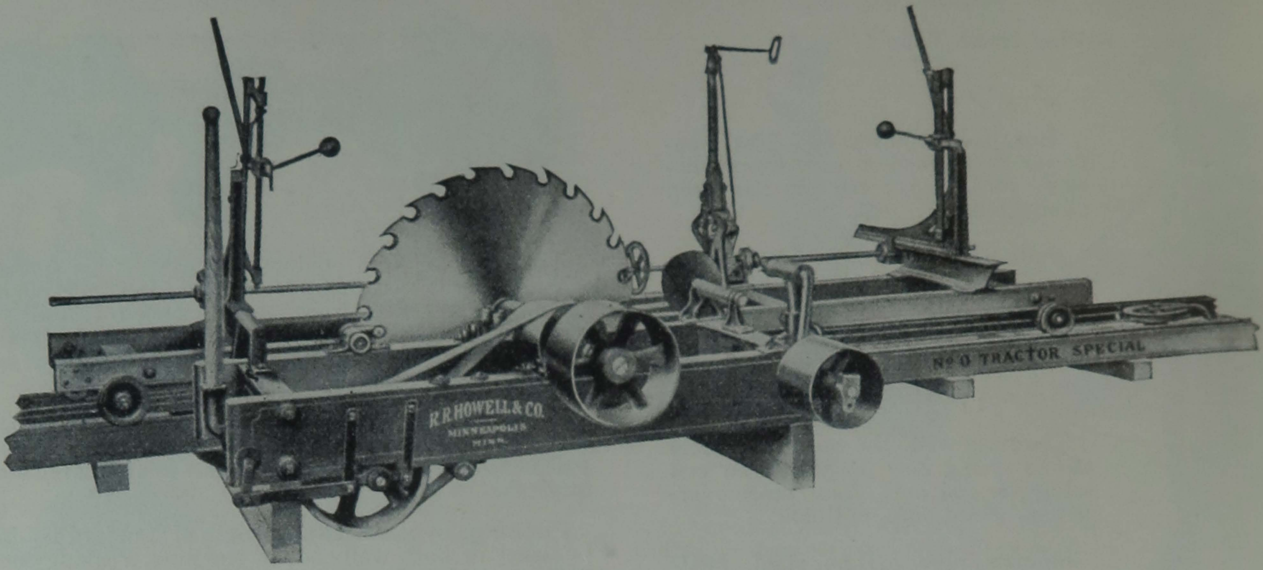
*1 No. 610 Simplex Push and Pull Jack ....each	$15.00
2 Sky Hooks....................................	4.00
1 Three-Way Base or Wheel Puller Attach....each	4.50
†1 No. 3A Spreader Jack.......................each	2.00
3 Size ½x40 inches Heat Treated Chains, Fitted with Forged Grab Hooks..................	10.50
1 Forged Lever Bar, size ¾x18 inches........each	.80
3 Stud Links....................................	3.00
Complete Equipment................................	$39.80
Special Tool Box for the Above................each	$3.50

Weight of complete equipment, 68 pounds.

*The 612, 614, 616 or 618 may be substituted in the maintenance set. The jacks may be purchased with any of the above equipment.

†The 3A jack is 3-inches closed, built for ½-inch pipe extension in the cap and 1-inch pipe extension in the base.

No. 0 Howell Tractor Special Portable Saw Mills



Saw frame or husk is 6½ feet long and 33½ inches wide. Side pieces are of fir 4x10 and ends of heavy cast iron, all securely bolted together, making strongest possible framework. Mudsills are bolted to lower side of husk and securely bolted to sills, insuring a rigid, completely self-contained unit.

Mandrel is $2\frac{3}{16}$ inches in diameter and 43 inches long, being unusually large and strong for a mill of this size. Will take any size saw up to 48 inches with standard hole. Drive pulley is 16x8 but can be varied according to size and speed of engine pulley.

Mandrel boxes are 7 inches long and of same heavy type used on larger mills; are self-oiling and provided with adjusting screws to regulate lead of saw.

Variable feed works are belt-driven, easy to operate and give sawer complete control at all times.

Carriage is 14 feet long and 25 inches wide, made of fir timbers, securely framed, cross braced and held together by rods extending through framework from side to side; 38 feet of T and flat steel track and track timbers of same length are furnished.

Mill is equipped with wire cable carriage drive, including a cast iron machine grooved drum, and end sheaves of large diameter and stands to match, making a light running carriage. A cable tightener roller is placed on one end of carriage so as to maintain proper tension on cable.

Four sets of 6-inch wheels and axles extending across width of carriage are furnished. Wheels are turned true, those on side toward saw being grooved to fit a T rail and those of opposite side turned to run on a flat track. Axles are $1\frac{3}{16}$ inches, run in strong babbitted bearings and are provided with set collars to take up any end play.

Two head blocks are furnished, base being of steel and practically unbreakable. Knees are made of cast iron and open 28 inches from saw, each having a lumber scale with large raised figures.

Two steel dogs are furnished, one on each head block. Same type used on larger mills, having drop weight or eccentric dogging lever and are quick and positive in action.

Set works are accurate, single acting and connected direct to set shaft. Scale on top of quadrant in plain view of setter indicates exact distance from face of knee to saw line. Ratchet wheel is made of a special hard chilled metal preventing wear and insuring accuracy. A slotted block with adjusting screw is provided to allow sawing boards of varying thickness. A hand wheel receder is provided on set shaft.

Self-contained construction, through which husk and center section of carriage track are built together as a single compact unit. This results in carriage being in automatic alignment with saw at all times, and makes it possible to set up mill complete in less than 20 minutes. Place in position husk with center section attached, lay down 2 end sections of track, one on each side of center section, secure with 4 nuts, put carriage on track, adjust cable, and mill is ready to start.

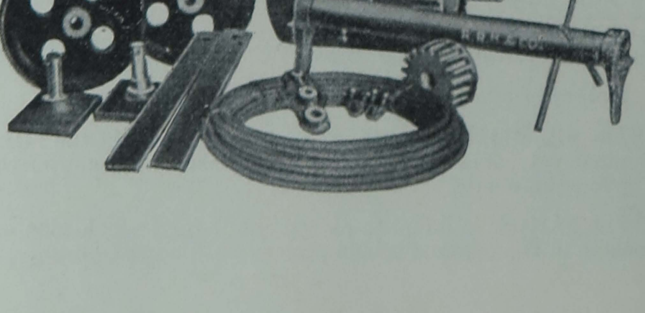
Operated by any size farm tractor from small 2-plow engine up, capacity averaging from 3000 to 8000 feet per day according to size of engine and kind of logs. Smaller engines may also be used, output being reduced accordingly. Any size log up to 32 inches in diameter and 20 feet long can be sawed.

Any size saw up to 48 inches having standard hole can be used.

Shipping weight, 2450 pounds.

No. 0, Complete without Saw................each **$380.00**

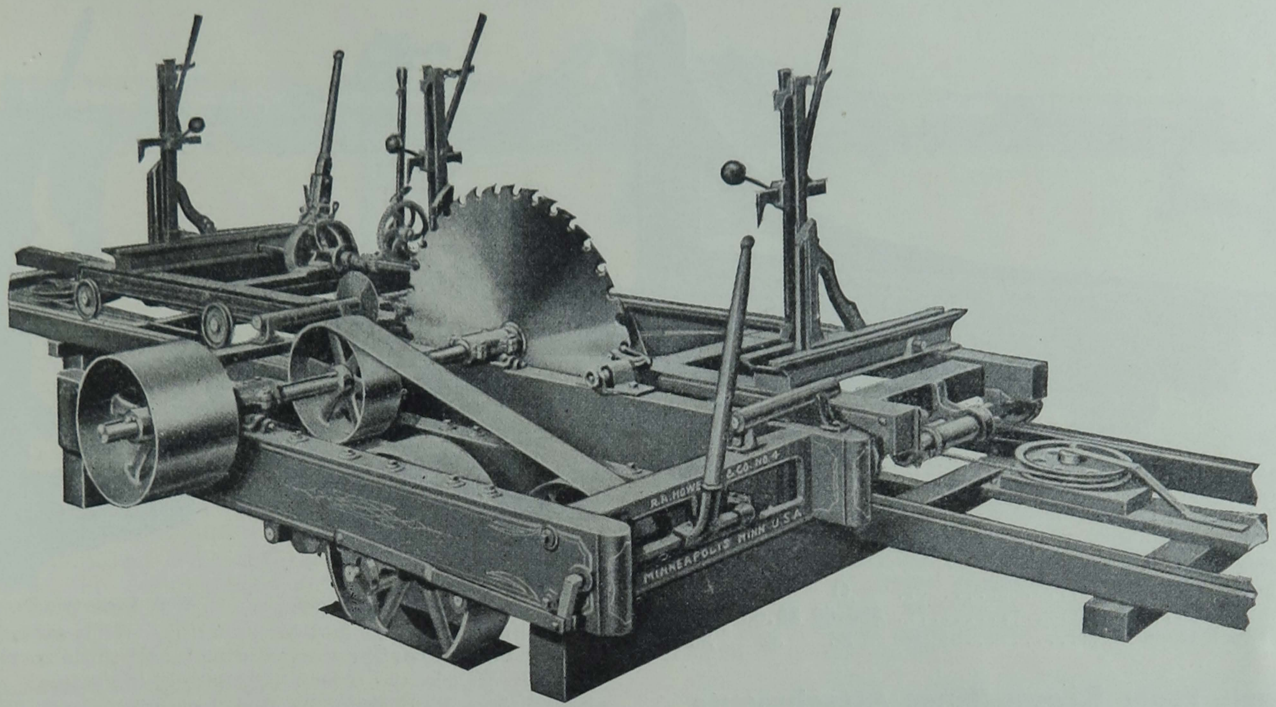
Howell Wire Cable Carriage Drives



Wire cable possesses sufficient elasticity to absorb shock of sudden starts and stops, yet does not stretch like manila rope. Does away with ice gathering in cogs of rack and pinion where this type of drive is used. Carriage may be run out farther to receive logs or deliver lumber by simply increasing length of carriage track. Cast iron drum has grooves turned on face to fit cable, thus avoiding flattening of cable and preventing several loops from chafing one against the other. With heavy stands with vertical pins carrying end sheaves in a horizontal position. Sheaves are of extra diameter reducing wear on cable.

Size No.	Drive Complete Each	Size Mill Used on	Diameter of Drum In.	Size Cable In.
0	**$45.00**	No. 0	10	$\frac{5}{16}$
1	**53.00**	Nos. A and B	12	$\frac{3}{8}$
2	**65.00**	Nos. 2 and 3	15	$\frac{1}{2}$
3	**85.00**	Nos. 4 and 5	18	$\frac{5}{8}$
4	**150.00**	Nos. 6 and Larger	24	$\frac{3}{4}$

Howell Saw Mills



Built for heavy service in more or less permanent locations where it is not desired to move mills often.

Built from high grade raw material; will stand long continuous service.

Husk is of generous proportions, side timbers and center piece being large size fir timbers and end pieces of heavy cast iron.

Equipped with variable friction feed. Frictions are of large diameter and extra wide face, and are operated by means of an eccentric box to which sawyer's lever is connected.

Arbor is made as nearly perfect as it is possible to produce. Mandrel boxes are of self-oiling type, made strong and heavy and with long bearings. Arbors of extra long length either in one piece or made as an extension connected with flange coupling; extra bearings can be furnished when required.

Carriage is 18 feet long, made of straight grained fir timbers strongly reinforced and securely rodded from side to side. Wheels and axles of ample size running in self-oiling boxes are supplied, insuring a light-running carriage.

Wire cable carriage drive is used. Cable drum is made of cast iron, large in diameter and grooved to fit cable. An adjustable roll or windlass is attached to one end of carriage to take up any slack in cable.

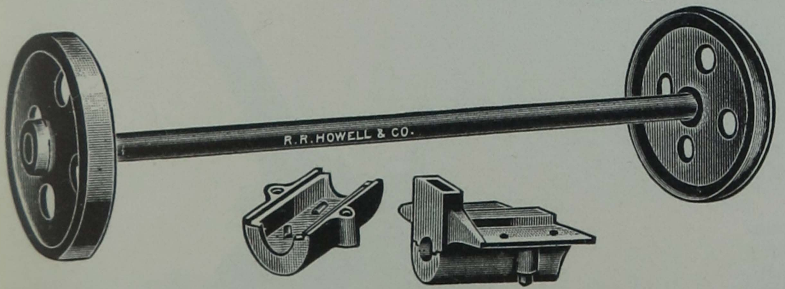
Two head blocks, opening 36 inches on No. 4 and 42 inches on No. 5, are furnished, each equipped with a strong single acting steel dog; of heavy construction with reinforced knees, and accurately machined and fitted. Both have lumber scales with large raised letters.

Regularly equipped with reliable single-acting set works, adjustable and reversible saw guide, lumber roller and splitter, 48 feet of steel double carriage track, wood way timbers and feed belt.

Additional head blocks, extra length or 2-piece carriage, duplex dogs, top saw, taper sawing attachment, and lever receder can be supplied at extra cost. No. 5 mill can be furnished with extra heavy head blocks if desired. Saw blades furnished at extra price.

No.	4	5
Mill each	**$1050.00**	**$1400.00**
Top Saw Attachment each	**250.00**	**275.00**
Capacity per Day ft.	15000–25000	20000–30000
Power Required h. p.	50–70	60–100
Wt. Mill lbs.	6200	7300
Wt., Top Saw Attachment lbs.	1200	1400

Howell Carriage Wheels and Axles

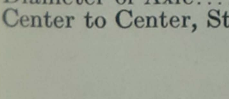

R.R. HOWELL & CO.

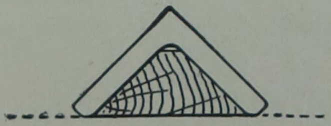
Has strong cast iron wheels and steel axles running in self-oiling boxes with large oil chambers. One wheel is shrunk solid on axle, turned true and grooved to fit either T or V steel rail. Other wheel has turned flat face, and runs on a flat steel track; runs loose on axle and is provided with a set collar to take up any end play.

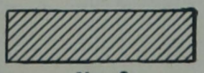
In ordering wheels and axles for other makes of mill give diameter of wheels wanted, distance from center to center of steel track and style of track for grooved wheel. Set consists of one axle, 2 wheels and 2 boxes.

Diameter of Wheels inches	**7**	**9**	**10**	**12**
Per Set	**$12.00**	**14.00**	**18.00**	**24.00**
Size Mill Used On	A, B, Nos. 2 and 3	4	5	6
Diameter of Axle inches	1¼	1½	1¾	2
Center to Center, Steel Track inches	48½	54½	55½	62½

Howell Steel Track for Portable Mills

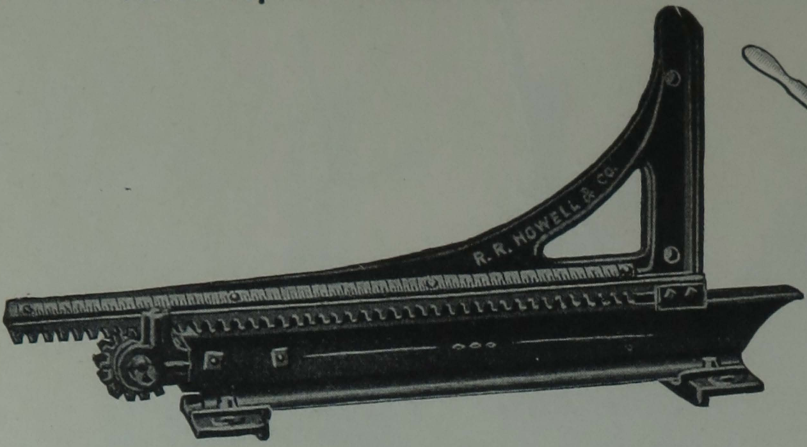

No. 1


No. 2


No. 3

No. 1, Tee Track	per foot	**$.45**
No. 2, V Track	per foot	**.32**
No. 3, Flat Track	per foot	**.25**

Howell Special Head Blocks

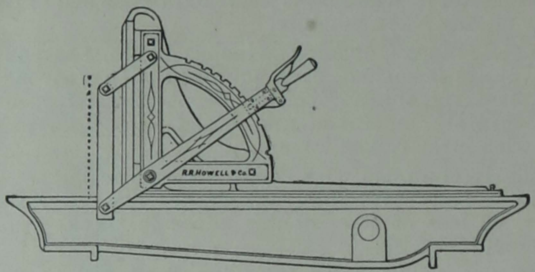

R. R. HOWELL & CO.

Heavy rolled steel base. Knee is of cast iron carefully machined and fitted. Lumber scale with raised figures is fitted on each block.

In ordering, state if mill is right or left and if front, rear or center block is wanted.

Size No.	O	A	B
Each	**$26.00**	**30.00**	**33.75**
Head Block Opening, inches	28	32	36

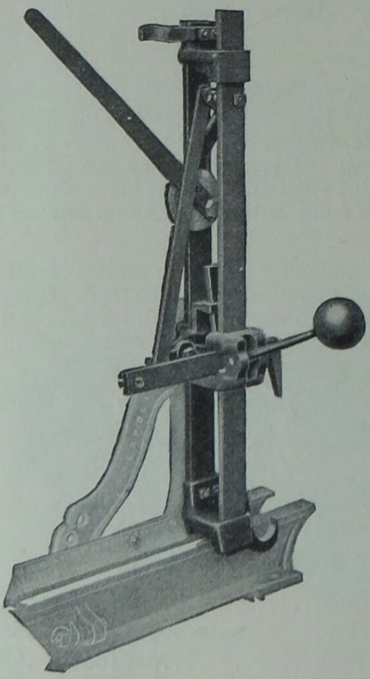
Howell Taper Sawing Knee Attachments



For thrusting forward small end of a log, for sawing tapering lumber and for holding steady, crooked timber. Simple construction; can be attached to any make or style of head block. Light pattern type for use on light mills; heavy pattern, for large mills.

Light Pattern	each **$10.00**
Heavy Pattern	each **12.00**

Howell Duplex Mill Dogs



For quarter sawing or for sawing other irregular piece stuff; will hold timber securely in any position. Avoids cutting of imperfect lumber.

Strong and heavy; made almost entirely of steel.

Will give long continuous service under most exacting conditions.

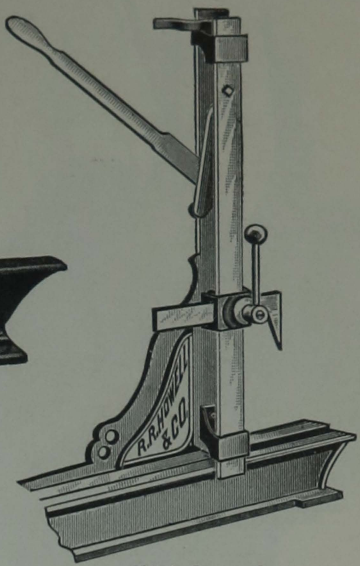
Simple construction; quick action.

For use on any size of mill.

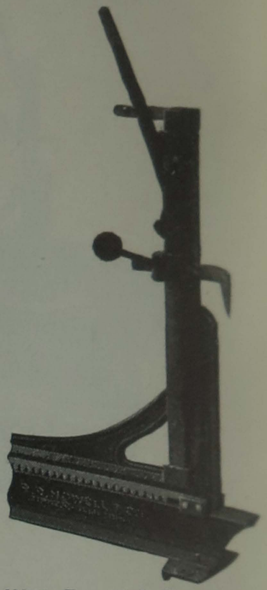
In ordering, state whether for right or left hand mill and if for front, center or rear head block.

Each........... **$35.00**

Howell Single Saw Mill Dogs


R.R.HOWELL & CO.

With Screw Lever



With Eccentric Drop Lever

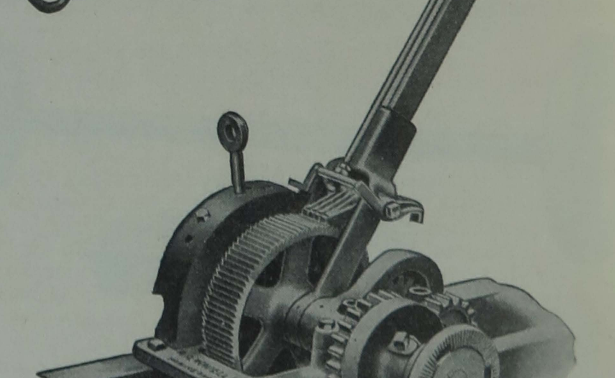
For light, medium and heavy mills. With exception of top and bottom castings, and sliding block, mills are entirely of steel. Will hold a frozen log securely in place.

Tool steel bit is instantly raised or lowered according to diameter of log and clamped with long lever. Screw lever dog has adjustable screw point by means of which length of screw can be adjusted to meet wear. Eccentric or drop lever dog is equipped with a heavy weight ball lever which securely holds tool steel bit in position.

In ordering state which of the two style of dogs is wanted, whether for right or left hand saw mill and what head block —front, center, or rear—dog is to be used on.

No. **1**, For Size A and B Mills	each **$13.00**
No. **2**, For Size No. 2, 3 and 4 Mills	each **17.00**
No. **3**, For Size No. 5 and 6 Mills	each **22.00**

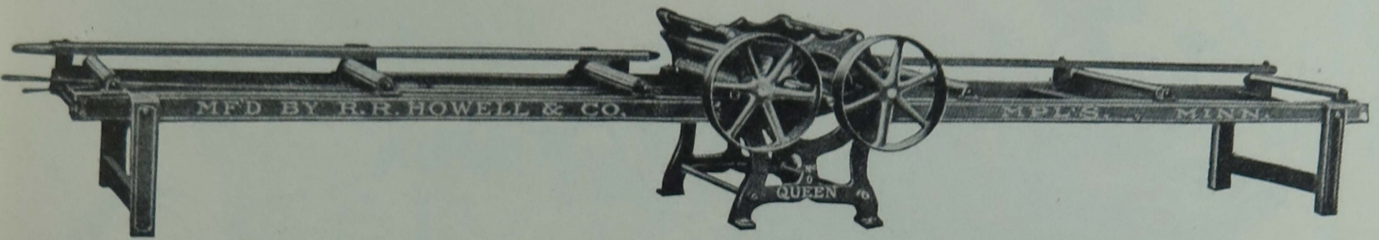
No. 20 Howell Single-Acting Quick-Receding Set Works



Accurate, dependable, simple operation; will insure lumber of even thickness. May be attached to practically any make of portable mill. Ratchet wheel is made of a special high carbon metal, teeth are machine cut. Each forward stroke of set lever recedes head blocks 6½ inches.

No. 20..each **$57.00**

Howell Queen 3-Saw Gang Edgers


MFD BY R.R. HOWELL & CO.
MPLS. MINN.
QUEEN

Designed to meet the demand for edgers in small sized mills, cutting from 8000 to 15000 feet of lumber per day. There is no machine of greater importance in the manufacture of lumber, aside from the saw mill itself, than an efficient edger, and no lumber plant is up-to-date or complete without one.

A good edger will not only considerably increase the capacity of the plant, but will reduce the cost of manufacture, saving both time and lumber.

The Queen Edger is 30 inches wide and is constructed in 3 sections—the working head and front and rear tables. The working head is made entirely of steel and iron and is self contained, all of the operating parts of the machine being built securely into the heavy cast iron frame work.

This method of construction is ideal for an edger of this type, as all working parts are held rigidly in place and there is no possibility of getting out of alignment. Also the labor involved in setting up and taking down the machine amounts to practically nothing.

The mandrel is 2$\frac{3}{16}$ inches in diameter with long bearings well supported. The machine has 2 fluted power driven feed rolls, one in front and one in rear of saws, also heavy pressure rolls above each feed roll, thus making the feed positive. The rolls are adjustable, enabling operator to take up any wear which may result from long use, so that the machine can be relied on to always edge accurately.

Both front and back pressure rolls are attached to a swinging frame, so arranged that rolls are self-raising, adjustable to different thicknesses of lumber, also are self-locking against lumber being thrown back.

The saws are shifted by hand levers, and the index is located on the front end of machine, convenient to the operator. Any thickness of stock up to 4 inches can be handled.

An edger is often expected to saw cants or flitches into scantling or small dimension and flooring, and for this purpose a gang of saws can be furnished fitted to a sleeve with space collars of proper thickness, which can be used in place of the regular saws or in connection with them. The price of collar and saws for this purpose will be quoted on receipt of specifications.

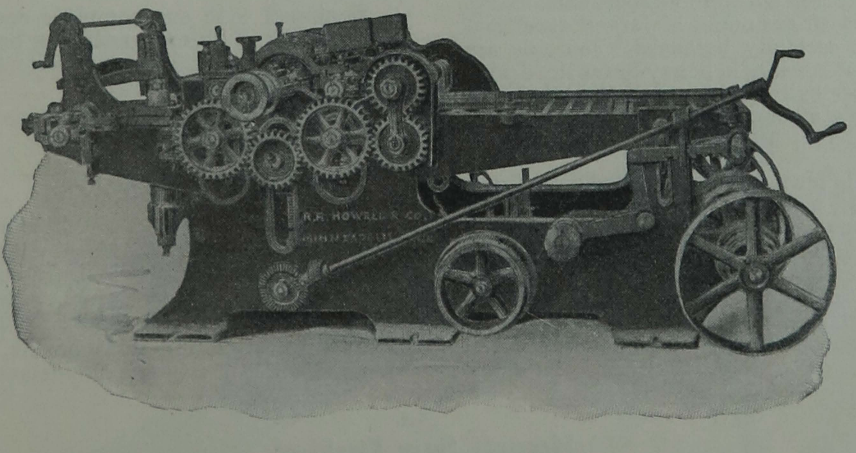
The Queen Edger is regularly built to carry three 14-inch saws, one stationary and two movable, but can be furnished with only two blades when desired. The driving pulley is 8x8 inches and the speed, 1800 r.p.m.

Weight, 1400 pounds.

Illustration shows a left hand machine, the drive pulley being on the left hand side. Both right and left hand edgers can be furnished, a right hand saw mill requiring a left hand edger and vice versa.

Queen Edger, with Three 14-Inch Saws........	each	**$250.00**
Queen Edger, with Two 14-Inch Saws.........	each	**225.00**

No. 20 Howell Planers and Matchers

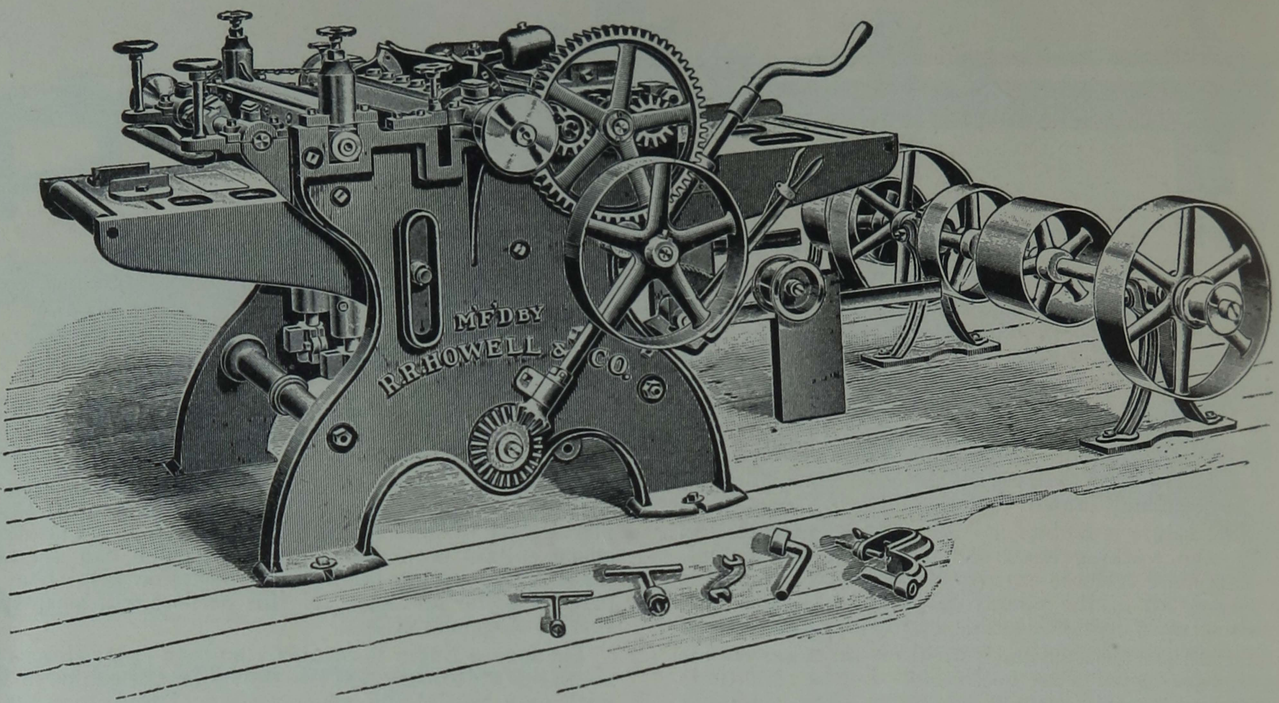


For dressing lumber, making flooring, ship lap, novelty siding, beading, etc. Will surface stock up to 24 inches wide and from ¼ to 8 inches thick. Cylinders are made from solid steel forgings, true planed, balanced, and slotted on all 4 sides, surfacing and moulding knives being used on same head. Top cylinder is belted at both ends. Shimer matching side heads are adjustable to make flooring in any width from 4 to 14 inches; arranged to be swung out of way when planing only. Front pressure bar may be swung clear of cylinder for sharpening or changing knives. Machine has 4 feed rolls, 6-inch diameter, driven by powerful gearing. Top in-feed roll may be solid in one piece or can be furnished in 2 sections so that 2 pieces of varying thickness may be surfaced at one time. Has 2 changes of feed, 40 and 60 feet per minute.

Furnished with complete countershaft with stands and pulleys, a set of 24-inch knives for each cylinder, one pair heads for flooring, one set of drop siding knives and one set of beading knives. Speed of countershaft, 900 r.p.m.; size of tight and loose driving pulleys, 12x8 inches; floor space required, 10⅙x7¾ feet; 8 to 12 h.p. drive.

No.	Each	Description	Wt. Lbs.
20-A	**$1350.00**	Double Surfacer, Divided Roll.....	6000
20-B	**1260.00**	Double Surfacer, Solid Roll.........	6000
20-C	**1220.00**	Single Surfacer, Divided Roll......	5700
20-D	**1180.00**	Single Surfacer, Solid Roll..........	5700

No. 50 Howell Standard Planers and Matchers



Machine will plane stock from $\frac{1}{8}$ to 6 inches in thickness, tongue and groove flooring, ceiling, etc., 12 inches wide or less and $\frac{3}{4}$ to $1\frac{1}{4}$ inches in thickness. For ship-lap, drop or patent siding, beading, mouldings, etc. Frame is well proportioned, strong and substantially built; so constructed that all belts used on machine clear each other, eliminating all unnecessary wear.

Table is $6\frac{1}{3}$ feet long, cast in one piece. Works in long guides carefully machined and fitted. Matcher spindles and heads are raised and lowered simultaneously with table, one hand crank controlling movement of both. An indexed guide enables operator to instantly set bed for stock of any thickness.

Single surfacer machine has one main top cylinder and double surfacer has in addition a lower cylinder, each carrying 2 surfacing knives. Both are made of forged steel machined perfectly true and carefully balanced. Journals are long and large in diameter, running in heavy boxes lined with anti-friction metal. Upper cylinders are driven by belts at both ends thus securing a strong, steady motion, without tremor or side strain.

Moulding attachment is placed immediately back of cylinder. Steel spindle is $1\frac{7}{16}$ inches in diameter and carries a slotted moulding head 6 inches long, and will swing bits $3\frac{1}{2}$ to 5 inches wide and $\frac{3}{8}$ inch thick. Head is adjustable, entire width of bed and complete moulding attachment can be adjusted vertically to cut from $\frac{1}{8}$ to $\frac{7}{8}$ inch deep. Machine is not regularly furnished or priced with moulding attachment and is not shipped with machine unless so ordered at additional price.

Provided with 3 pairs of feed rollers, $3\frac{1}{2}$-inch diameter, 2 in front of cylinder and one in rear. The 3 upper rollers are power driven, 2 in front of cylinder being fluted and are controlled by weighted levers.

Shimer matcher heads and knives are furnished with machine. Steel matcher spindles $1\frac{3}{16}$ inches in diameter carry heads; run in independent frames having $4\frac{1}{2}$-inch self-oiling boxes. Matcher heads are easily removed when surfacing wide stock.

Three upright stands with babbitted bearings are furnished to carry shaft. All pulleys are of correct size to drive machine at proper speed.

Speed of cylinders, 3600 r.p.m.; speed of countershaft, 900 r.p.m.; size, tight and loose pulleys, 10-inch diameter, 6-inch face.

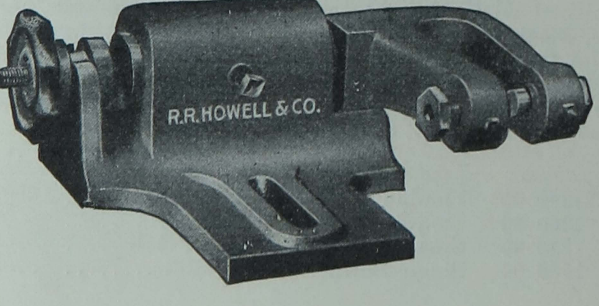
Equipped with one complete countershaft with 3 stands and pulleys, 2 Shimer matching heads and knives, and one set of surfacing knives and bolts for each cylinder. Belts and sizing heads are extra.

If size machine wanted is not specified, No. 50-C, 24-inch single surfacer is always shipped.

No.	Each	Rubber Belts per Set	Description	H.P.	Wt. Lbs.
50-A	**$500.00**	**$30.00**	18-In. Single Surfacer	5–8	2700
50-B	**630.00**	**37.50**	18-In. Double Surfacer	6–10	2900
50-C	**590.00**	**30.00**	24-In. Single Surfacer	6–10	3000
50-D	**725.00**	**37.50**	24-In. Double Surfacer	7–12	3250

Extra for Moulding Attachment, Complete..each	**$40.00**
Extra for Set of 2 Sizing Heads and Knives..per set	**20.00**

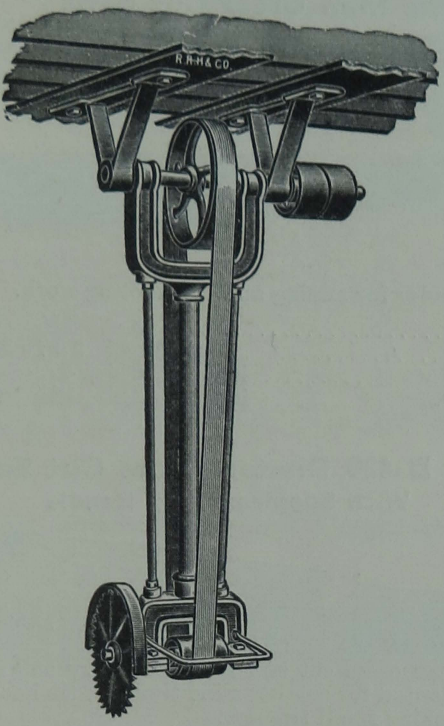
Howell Saw Guides


R.R.HOWELL & CO.

Guiding arms are moved laterally by means of a screw wheel conveniently placed so that adjustment can be made with perfect safety while saw is in motion. Arms may be turned back out of way when changing saws and dropped back in position without altering alignment of blade. Guide pins are of hardwood with end grain to saw and held in brass sockets. Easily replaced when worn out. Frame has slotted holes to permit adjustment for different size saws. May be used on either right or left hand mills.

No. **1**, For Nos. 0, A and B Mills and Bolters..............each	**$9.00**
No. **2**, For Nos. 2, 3, 4 and 5 Saw Mills....................each	**15.00**
No. **3**, For Nos. 5, 6 and Larger Saw Mills.................each	**22.00**

Howell Swing Cut-Off Saws

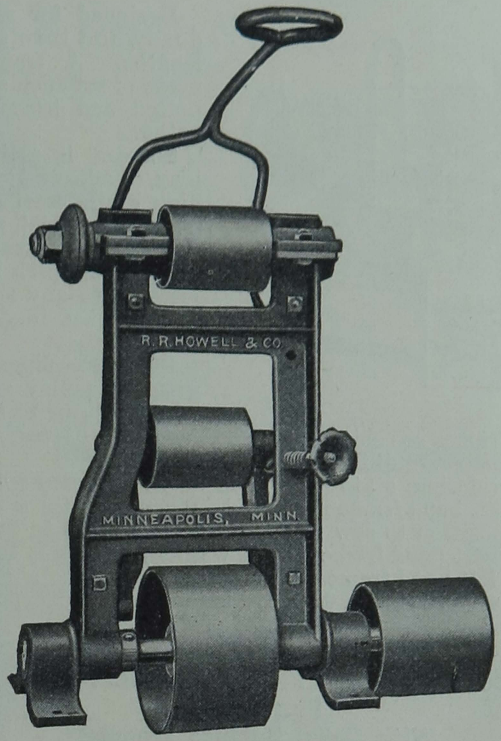


Made to swing from overhead; can also be furnished to swing from below. Frame work consists of 2 heavy cast iron yokes, upper carrying countershaft and lower one the saw mandrel, both being connected by a strong steel tubing reinforced and braced by 2 heavy side rods.

Entire machine swings on outside of turned sleeve boxes, and countershaft runs in babbitted bearings inside of boxes, making it impossible for any part to get out of line. Mandrel is made of steel accurately turned and balanced and runs in self-oiling boxes. Regular length of machine from base of hangers to center of arbor is 6 feet, but any other length can be furnished when specified. Any size saw, from 14 to 30 inches may be used, machine being regularly furnished with a 20-inch blade, which is included. Belt is furnished at extra cost.

Each.. **$75.00**

No. 12 Howell Slab Saws
Undercut


R. R. HOWELL & CO.
MINNEAPOLIS, MINN.

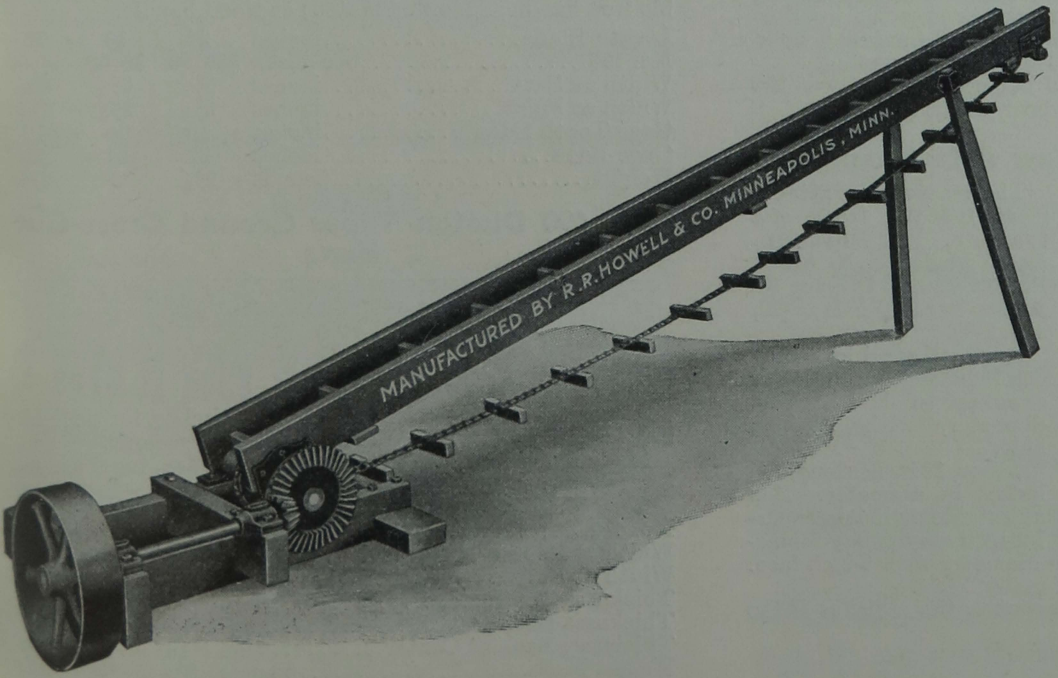
Made to swing from underneath. For cutting up slabs, bolts, etc. Frame is made in one solid, heavy casting, with wide yoke and broad, heavy ribbed arms. Ring joints or boxes are provided on countershaft for carrying weight of frame and these also act as a pivot on which frame hinges.

Small saw has belt tightener; larger sizes have sufficient distance between 2 shafts to allow an ordinary belt to be kept tight, not furnished with tighteners.

Prices do not include saw or belt.

Size No.	A	B	C
Each	**$50.00**	**60.00**	**70.00**
Distance Countershaft to Arbor.....in.	24	36	48
Size of Arbor Pulley.....in.	5x6	6x6	6x6½
Large Countershaft Pulley.....in.	10x6	16x6	18x6½
Small Countershaft Pulley.....in.	7x7¼	10x8	10x8
Speed Countershaft Pulley.....r.p.m.	500	500	500
Weight.....lbs.	160	200	275

Howell Sawdust Carriers


MANUFACTURED BY R.R.HOWELL & CO. MINNEAPOLIS, MINN.

Can be used with any portable saw mill. Chips, bark or saw dust willl not clog carrier.

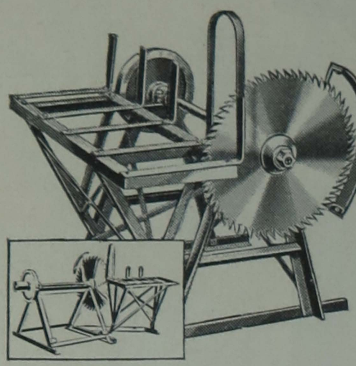
In operation, jack is placed in a pit under saw, and is driven direct from saw mandrel. Usually no pulley is required on mandrel, as speed is sufficient to operate carrier by running belt direct on mandrel or arbor. Conveyor trough is hinged on jack, leading out under carriage track, and can be raised or lowered to any desired angle.

Standard length of conveyor is 16 feet and speed of chain about 80 feet per minute. Weight, 425 pounds.

Complete with 16-Foot Conveyor.....each **$50.00**

For Longer Conveyor ....per foot **1.40**

No. 20 Diamond Tilting-Table Steel Saw Frames



Designed for sawing cordwood into stove lengths. A frame is made of 2x2-inch angles bolted and braced together.

Mandrel is 49 inches long, made of 1½-inch high grade steel shafting with 1⅜-inch arbor, furnished with guard for saw blade which is adjustable to any size up to 32 inches in diameter.

Regular equipment is with 5x6 pulley and 60 or 90-pound balance wheel. Frames are shipped knocked down. With each shipment is included full instructions for erecting.

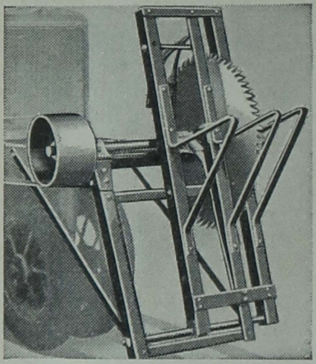
When ordering, state number of outfit and also whether right or left hand frame is wanted. When operator is facing table in position to saw wood and desires wood to drop to right, a right hand frame will be wanted; if wood is to drop to left, a left hand frame will be wanted.

Shipping weight with 60-pound balance wheel, 200 pounds; with 90-pound balance wheel, 240 pounds.

Prices upon application.

No. 50 Diamond Tilting-Table Pole Saw Frames

With Down Balance Wheel



Designed for sawing long poles, fence rails, timbers, etc., as well as cordwood. Balance wheel is placed beneath the frame which leaves the table clear at both ends.

A-frame is made of 2x2-inch angles bolted and braced together.

Mandrel is 45 inches long, made of 1½-inch high grade steel shafting with 1⅜-inch arbor, furnished with guard for saw blade which is adjustable to any size up to 32 inches in diameter.

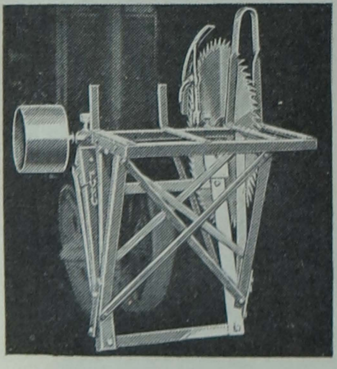
Regular equipment is with 5x6 pulley and either 60-pound or 90-pound balance wheel.

When ordering, state number of outfit and also whether right or left hand frame is wanted. When operator is facing the table in position to saw wood and desires the wood to drop to the right, a right hand frame will be wanted; if wood is to drop to the left, a left hand frame will be wanted.

Shipping weight with 60-pound balance wheel, about 290 pounds; with 90-pound balance wheel, about 330 pounds.

Prices upon application.

Diamond Tractor Saw Attachment



The tractor saw attachment for the front of a tractor. For Fordson, Deere Model G, P, A and B, McCormick-Deering 10-20, and Farmall F-12, F-20, and F-30.

Angle all steel frame securely bolted together. For saws up to 32 inches in diameter, with 1⅜-inch hole.

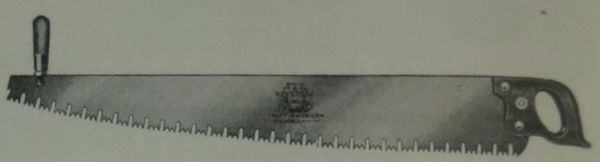
Arbor, 38 inches long, 1½ inches in diameter. Has adjustable, babbitted bearings. Heavy pulley replacing balance wheel; is 8 inches in diameter with 6-inch face. Takes 16-18-foot belting.

Shipped all set up, ready to mount to the radiator of the tractor.

Prices upon application.

No. K-924 Keystone Great American One-Man Cross Cut Saws

Straight Back—With Supplementary Handle

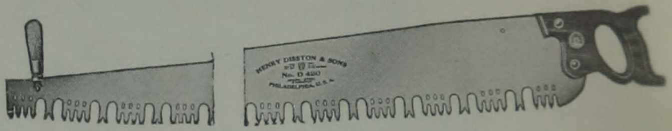


Very popular for mining and contracting work.

Length......feet	3	3½	4	5
No. **K-924**......each	**$2.45**	**2.87**	**3.27**	**4.10**
Width at Butt......inches	6¾	7	7¼	7⅝
Width at Point......inches	2⅛	2⅜	2½	2¾
Approximate Weight...... pounds	3¼	4	4¾	6½

No. D-420 Disston Cross Cut Saws

With Supplementary Handle

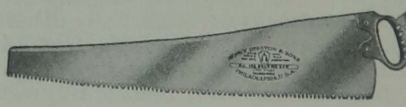


This 1-man cross cut saw is made heavy and stiff. Especially adapted for cutting mine timbers, tie hacking, felling and bucking small timbers.

Blade takes a high temper. Made skew-back with curved breast. Blade of 14 gage and is tapered 4 gages thinner on the back. Hardwood handle, weatherproof finish, 2 horns, large hand hole. Packed 3 in a bundle.

Length of Blade......feet	3½	4	4½
No. **D-420**......each	**$6.20**	**6.80**	**7.70**
Width at Butt......inches	6⅞	7	7¼
Width at Point......inches	2 11/16	2 13/16	3
Weight Each......pounds	4½	5	5¾

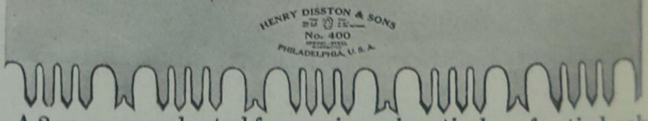
No. 196 Disston Docking Saws



Made for rough, heavy work in lumber yards, ship yards, car shops, on the farm, in the mine, for railroad work, etc. Blade of Disston steel; taper ground from tooth edge to back and from point to butt; fleam teeth, 4½ points to the inch, filed with wide bevel, and set; curved breast. Malleable iron handle, cadmium plated; or wood handle.

Length Blade......inches	24	30	36
No. **196**......per dozen	**$30.00**	**36.00**	**44.00**
Width at Butt......inches	6⅜	6⅝	6¾
Width at Point......inches	2⅛	2⅝	2⅝
Gage Tooth Edge......inches	19	18	18
Gage Back......inches	22	21	21
Weight......pounds	2¾	3	3½

No. 400 Disston Taper Ground Cross-Cut Saws

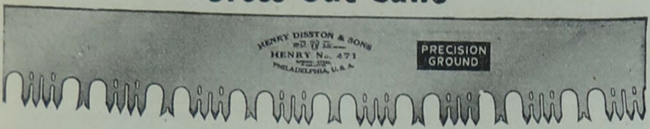


A 2-man saw adapted for sawing mine timber, for tie hacking, for pole, piling, bridge and construction work.

Made of special steel, 13 gage on tooth edge, taper ground 3 gages off back.

Length of Blades......feet	4	4½	5
No. **400**......each	**$6.30**	**7.10**	**7.90**
Width at Center......inches	4⅜	4⅜	4½
Width at Ends......inches	3 3/16	3 3/16	3 3/16
Thickness Tooth Edge......gage	13	13	13
Thickness Back at Ends......gage	15	15	15
Thickness Back at Center......gage	16	16	16
Weight Each......pounds	3¼	4	4¾

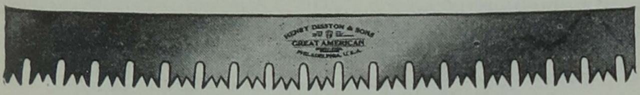
No. 471 Disston Henry Pacific Coast Cross-Cut Saws



Made especially for pine and small timber operations. Made of Disston alloy steel. Full curved breast; light in weight due to hollow back. Medium width blade runs free in binding timber and requires very little set.

Length of Blade . . . . . feet	**6**	**6½**	**7**
No. **471** . . . . . each	**$11.10**	**12.80**	**14.50**
Width at Center . . . . . inches	5¾	6	6¼
Width at Ends . . . . . inches	3⅜	3⅜	3⅜
Thickness Tooth Edge . . . . . gage	14	14	13
Thickness Back at Center . . . . . gage	19	19	18
Thickness Back at Ends . . . . . gage	17	17	16
Weight Each . . . . . pounds	5¾	6½	7¼

Disston Great American Crosscut Saws



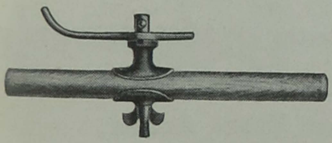
Two-man wide; taper ground.

No. 122 is 2 gages thinner on back than on tooth edge.

No. 124 is 4 gages thinner on back than on tooth edge.

Length . . . . . ft.	**4**	**4½**	**5**	**5½**	**6**	**7**
No. **122** . . . . . each	**$4.35**	**$4.95**	**$5.55**	**$6.15**	**$6.60**	**$7.80**
No. **124** . . . . . each	**4.65**	**5.10**	**5.80**	**6.40**	**6.90**	**8.05**
Width at Cen . . . . . in.	5 3/16	5¼	5½	5⅞	6	6½
Weight . . . . . lbs.	3¼	4	5¼	6¼	7¼	8½

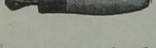
No. 128 Disston Cross-Cut Saw Handles



Handle is made of selected hardwood, 13⅛ in. long, 1⅛ inches in diameter; extra heavy casting, with malleable guard. Bolt and guard can be used in vertical or horizontal position. Packed 10 pairs in carton.

No. **128**, Wt. per Pair, 2½ Lbs. . . . . per pair **$1.40**

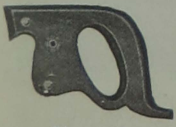
No. 118 Disston Cross-cut Saw Handles



Supplementary handle is 4¾ inches long, 1 5/16 inches in diameter at thickest part. Heavy steel ferrule, washer, rod and nut fastened inside. Weight, 4 pounds per dozen.

No. **118** . . . . per dozen **$3.80**

Disston One-Man Cross-Cut Saw Handles



No. 218

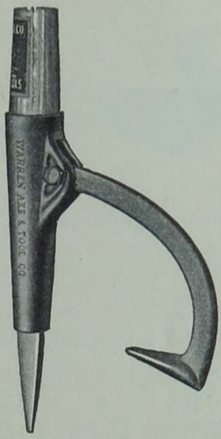
Slit and bored for three screws.

No. **218**, Single Horn Handle . . . . per dozen **$6.20**

No. **318**, Double Horn Handle . . . . per dozen **7.80**

Malleable Solid Socket Peavies

Western Pattern


WARREN AXE & TOOL CO.

With duck bill, round or diamond head hooks and selected maple handles.

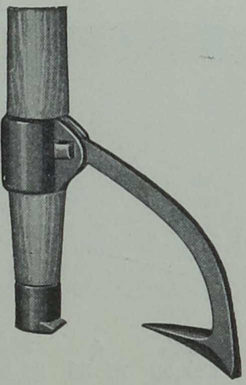
Hook is made of high carbon steel with heavy upset head. Bolt is of steel with square head and hexagonal nut. Socket is made of malleable iron and is clean, smooth and light.

Pick is hand forged of carbon steel and driven in cold, with cement to secure it more firmly.

Stocks are turned from the best timber, straight grained and seasoned.

No.	**3206**	**3207**	**3208**
Per Dozen	**$37.80**	**39.00**	**40.00**
Size	2½"x4'	2½"x4½'	2½"x5'
Wt. per Doz. lbs.	115	120	125

Malleable Clasp Cant Hooks

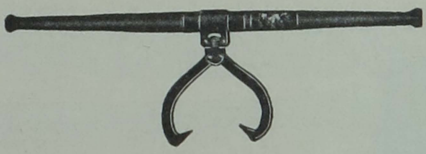


With Steel forged short toe ring and duck bill, round or diamond head hook.

With select handles, straight grained and air seasoned.

No.	**222**	**223**	**224**
Per Dozen	**$29.30**	**30.40**	**31.40**
Size	2½"x4'	2½"x4½'	2½"x5'
Wt. per Doz. lbs.	87	92	97

Timber Carriers or Lug Hooks

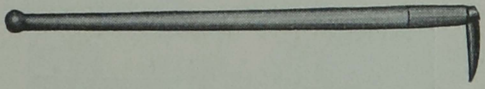


For use wherever timber is handled, in lumber yards around the mill, for handling ties, telegraph poles, etc.

Equipped with chisel point hook and maple handle. The hooks and clasp are forged from high carbon steel with annealed malleable swivel to permit handling timber in narrow places.

No.	**608**	**609**	**610**
Per Dozen	**$34.70**	**35.50**	**36.30**
Length Handle . . . . feet	4	4½	5
Wt. per Dozen . . . . pounds	95	100	106

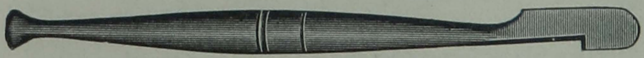
No. B-120 Pickaroons



For handling telegraph poles, ties, etc. Ferrules are seamless. Length handle, 3 feet.

No. **B-120** . . . . per dozen **$15.40**

Bark Spuds

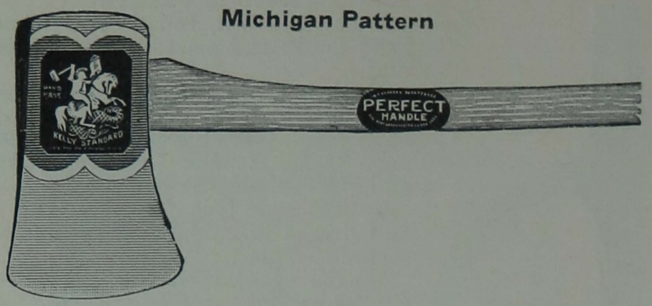


For peeling bark. Blade is forged from high carbon steel, and has a maple handle, 12 to 15 inches in length.

Price, No. **638**, with Handles . . . . per dozen **$18.30**
" " **639**, without Handles . . . . " **17.00**

Kelly Standard Single Bit Axes

Michigan Pattern

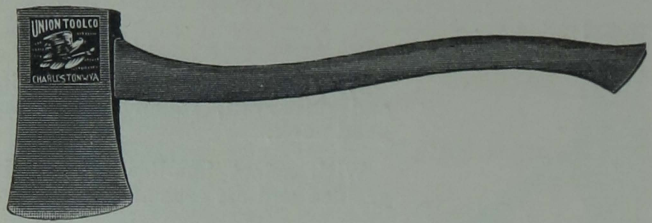


Soft steel body, crucible steel bit, hand tempered, polished blade.

Size.......pounds	3½	4	4½
Per Dozen	$24.25	25.00	25.75

Union Single Bit Axes

Dayton Pattern

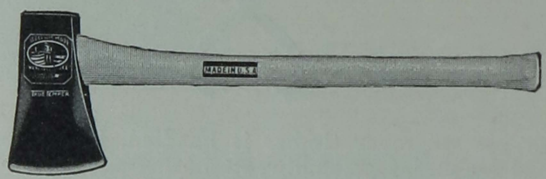


Forged, one piece, solid steel. Black forge finish. Hickory handle, stained walnut. Made for service, with practical, but inexpensive finish.

Packed 6 in a crate.

Size.......pounds	3½	4	4½
Per Dozen	$20.50	21.25	22.00

Kelly Flint Edge Rafting Axes

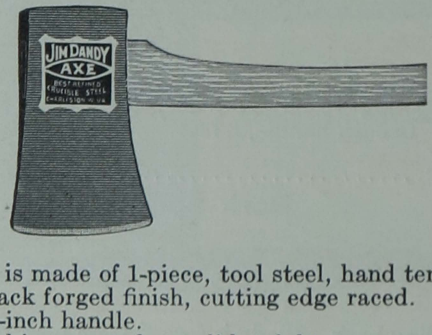


Hardened poll, hand tempered, special chemical black finish, cutting edge honed.

Packed 6 in a crate.

5-Pound Size........per dozen $28.75

Kelly Jim Dandy Miner's Axes

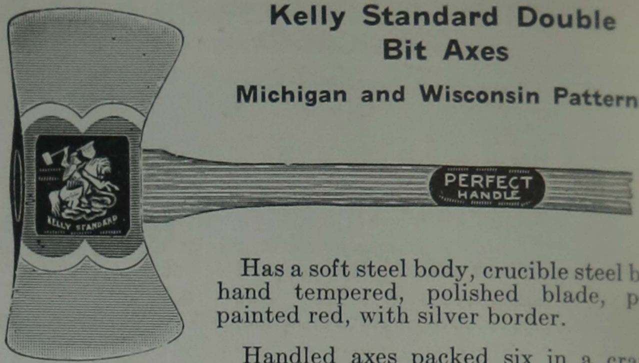


This axe is made of 1-piece, tool steel, hand tempered.
Has a black forged finish, cutting edge raced.
Has a 26-inch handle.
Furnished in assorted or solid weights.
Packed 6 in a crate.

Size.......pounds	3½	4
Per Dozen	$18.65	19.40

Kelly Standard Double Bit Axes

Michigan and Wisconsin Patterns



Has a soft steel body, crucible steel bit, hand tempered, polished blade, poll painted red, with silver border.

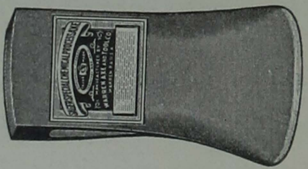
Handled axes packed six in a crate, handles wrapped in burlap or paper; unhandled axes packed 12 in a box.

Wt. Head..lbs.	3½	4	4½	5	5½	6
Per Dozen	$28.45	29.25	29.80	30.50	31.50	32.25

Sager Patent Chemical Process Axes

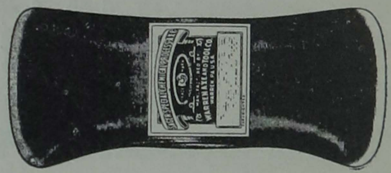
Forged and tempered by a special chemical process which gives the steel greater durability and a greater capacity to hold a finer cutting edge. Natural blue color is obtained from the special tempering process and insures perfect temper.

Single Bit—Wisconsin Pattern



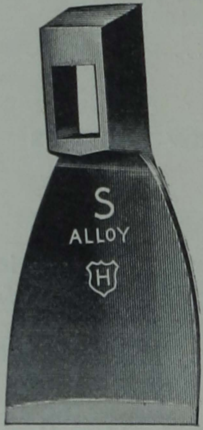
Weight.......lbs.	3½	4
Per Dozen	$26.60	27.30

Double Bit—Wisconsin Michigan Patterns



Weight.....lbs.	3½	4	4½	5	5½	6
Per Dozen	$31.40	32.15	32.90	34.15	34.90	35.75

Hubbard Super Steel Adzes



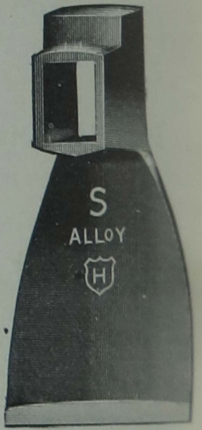
No. 331-A

Made from alloy steel of special analysis and designed to meet the severe service required of track adzes.

No. 331-A is a railroad adze; No. 332-A a carpenters' adze.

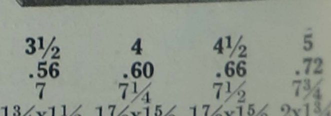
Made with cutting edge 3½ to 5 inches.

Prices upon application.



No. 332-A

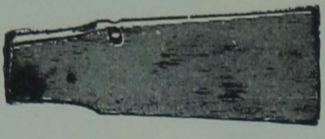
No. 135 Tie Wedges



Especially adapted to making railroad ties.

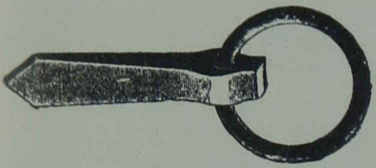
Weight......pounds	3	3½	4	4½	5
Each	$.46	.56	.60	.66	.72
Length......inches	6¾	7	7¼	7½	7¾
Head........inches	1¾x1½	1¾x1½	1⅞x1⅝	1⅞x1⅝	2x1¾
Bit.........inches	2⅝	2¾	2⅞	3	3⅛

No. 305 Steel Saw Wedges



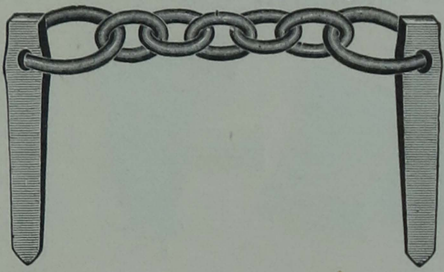
Price, No. **305** . . . . per pound **$.16**

Ring Dogs



Price, No. **317**, ¾-in. Square Dog, ⅜-in. Ring . per 100 . . . . . .
" " **318**, 7/16 " " " 7/16 " " " 100 . . . . . .
" " **319**, 1 " " " ½ " " " 100 . . . . . .

Chain Rafting Dogs



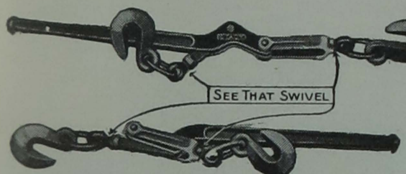
Five Link.—Made with five 5/16-inch center links and two ⅜-inch end links.

Seven Link.—Made with seven 5/16-inch center links and two ⅜-inch end links.

Size of dogs or blades, 1⅛ inch x ⅜ inch x about 6 long.

Weight.—Five link dog about 2¼ pounds each. Seven link dog about 2½ pounds each. Prices upon application.

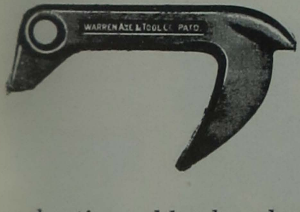
Stacy Swivel Load Binders



For binding loads of logs, lumber, pipe, boilers, poles or any load that requires binding with a chain. Does away with the old fashioned boom pole. Binds loads firmly, quickly and easily. Made in 4 sizes: Midget size; regular size, for ordinary use; jumbo size, for heavy work; and special jumbo. The swivel joints permit hooks to turn with twist of chain and prevent chain from breaking. A pair is 2 separate load binders.

Size	Wt. Lbs. per Pr.	Per Pr.	Size	Wt. Lbs. per Pr.	Per Pr.
Midget	4	**$1.75**	Jumbo	20	**$3.25**
Regular	14	**2.30**	Jumbo, Special	28	**5.00**

Improved Bull Dog Patent Logging Dogs or Log Grabs

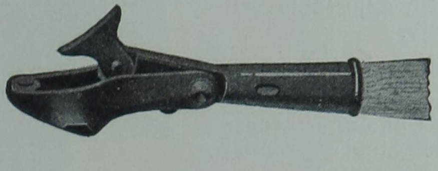

WARREN AXE & TOOL CO. PATD.

This grab is easily driven and extracted, and holds on with Bull Dog tenacity. It is forged from the highest quality crucible analysis steel of the right carbon, to be tough but not brittle.

Made in 5 sizes as follows: No. 0 is for pulp wood and small hardwood; No. 1 is for crotch grabs, ties and hardwood; No. 2 is for trailing and is also a popular size with many for soft wood; No. 3 is the large size for hemlock and other soft woods; No. 6 is for extra large timber of all kinds.

No.	Size No.	Approx. Wt. Lbs. per Doz.	Price per Dozen	No.	Size No.	Approx. Wt. Lbs. per Doz.	Price per Dozen
277	0	12	**$4.80**	**280**	3	27	**$7.40**
278	1	20	**5.80**	**A280**	6	42	**8.30**
279	2	24	**6.50**	. . .	. .	. .	. . . .

No. 5 New Badger Car Movers

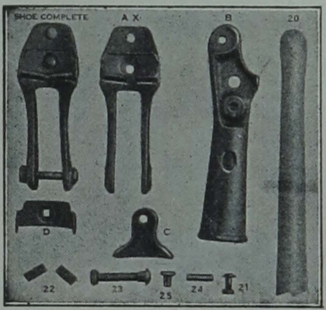


The New Badger is light and well balanced, easily operated by one man. It has a powerful forward pushing stroke that moves loaded cars with the least effort, and it is built strong enough to stand up under the most severe usage. Besides having the power, it has a quick-acting toggle action, that will move and follow up empty cars quickly.

Length, 70 inches over all. Weight, 18 pounds.

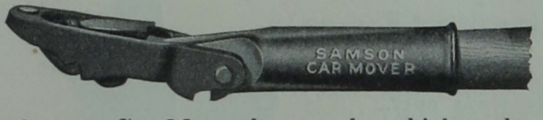
No. **5** . . . . each **$8.00**

Repairs for No. 5 New Badger Car Movers



No.	Description	Price Each
AX	Shoe Complete . .	**$3.00**
AX	Shoe Only	**2.00**
B	Socket	**2.00**
C	Cam	**1.00**
D	Spur Clamp	**.50**
20	Handle, Select Northern Hard Maple . .	**2.00**
21	Bolt for Clamp D	**.10**
22	Spurs—Slip-proof Safety, per Set of 2	**.50**
23	Bolt for Shoe AX	**.20**
24	Rivet for Cam C	**.10**
25	Hard Steel Nose Point for Shoe AX	**.20**

Samson Car Movers



The Samson Car Mover has one long high carbon tool steel spur that secures its grippage on the top of the rail.

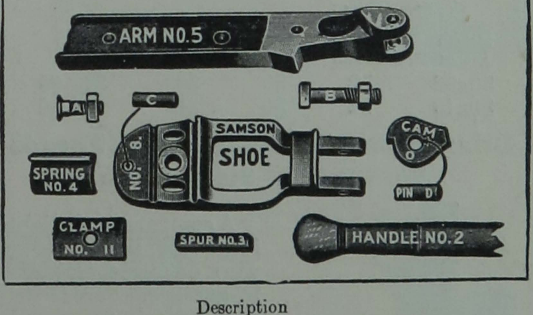
Handle turned from selected second growth rock maple.

Length over all, 68 inches.

Weight, 16 pounds.

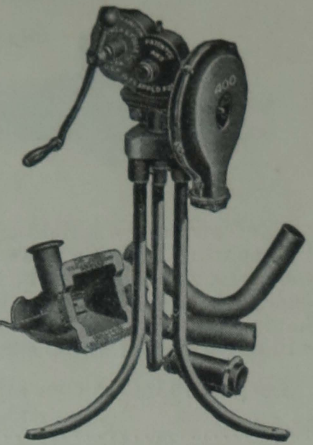
Samson Car Movers, Complete . . . . each **$8.00**

Repair Parts



No.	Description	Each
0	Cam or Toggle in End of Arms No. **5** and **27**	**$.50**
2	Rock Maple Handle	**2.00**
3	Tool Steel Spur	**.50**
5	Channel Arm with Cam or Toggle No. **0**	**3.00**
8	Shoe in Which Spur No. **3** Is Located	**2.00**
11	Plate or Clamp for Holding Spur No. **3**	**.40**
27	Socket Arm with Cam or Toggle No. **0**	**3.00**
A	Steel Bolt for Spur Plate No. **11**	**.10**
B	Steel Bolt for Fastening Shoe to Arm	**.10**
C	Steel Rivet in End of Shoe No. **8**	**.10**
D	Steel Rivet Thru Cam No. **0**	**.10**
R	Arm and Handle Bolt	**.10**

Champion Blowers



Made with adjustable ball bearings only.

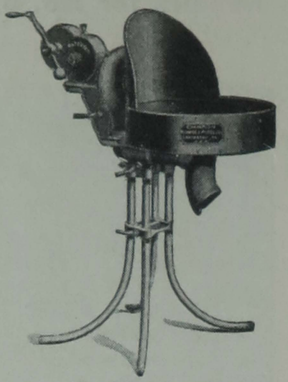
Crank turns either way.

High speed spiral gearing with special phosphor bronze spiral gear and tool steel spiral shaft.

Whirlwind blast, anti-clinker, heavy nest tuyere iron and complete piping furnished.

No.	Each	Fan In.	Wt. Lbs.
400	**$36.00**	12	160
420	**42.00**	14	170
421	**47.00**	16	175

Champion Steel Rivet Forges



Made with bronze and steel gears and adjustable ball bearings throughout.

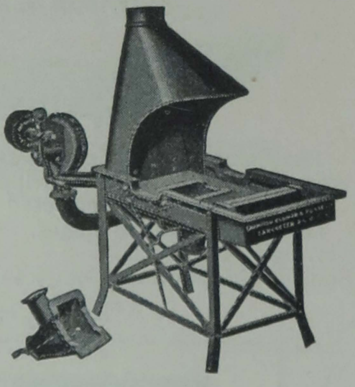
Hearth of 10 gauge steel, tuyere plate heavy cast iron.

Used by railroads, bridge builders, boiler and structural iron workers.

It will produce blasts to weld 3½ to 4-inch iron in ten minutes. Crank turns either way to make blast. Each turn of crank produces 46 revolutions of fan wing.

No.	Hearth In.	Fan, In	Ht., In.	Wt., Lbs.	Price, Ea
401	18	9	30	135	**$33.00**
401½	22	9	30	145	**36.50**
401¾	24	10	30	150	**40.00**

Champion Steel Blacksmiths' Forges



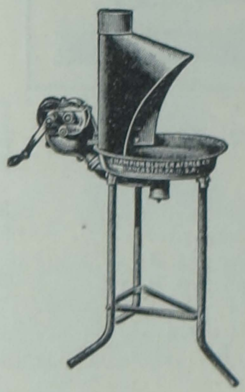
Made with adjustable ball bearings only. Has half hood. Hearth is made of heavy steel plate with perpendicular sides 6 inches wide, thus making the forge 6 inches deep.

Furnished regularly with No. 400 Champion Whirlwind blast, anti-clinker, heavy nest tuyere iron.

No.	Hearth Inches	Fan Inches	Height Inches	Weight Pounds	Price Each	Extra for Water Tank
408	30x36	12	30	300	**$60.00**	**$5.00**
409	30x40	12	30	315	**65.00**	**5.00**

Champion Eureka Geared Forges

With Pressed Steel Hearth



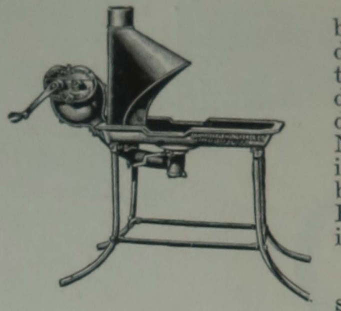
A comparatively light weight forge for light and medium work on farms, plantations and in garages. Fan is driven by cut helical gears running smoothly and noiselessly in a dust-proof oil-tight gear case.

Hearth is stamped from a single sheet of extremely heavy steel.

No. 145S has shield, No. 146S, half hood.

No.	Hearth In.	Fan In.	Ht. In.	Wt. Lbs.	Price Each
145S	18	8	30	45	**$10.00**
146S	18	8	30	50	**11.50**

Champion Eureka Geared Forges

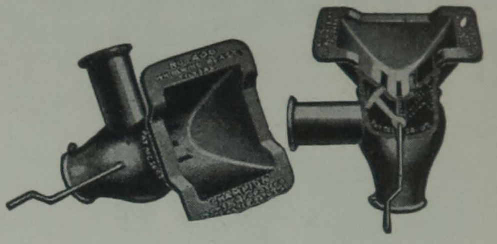


Gears are cut and lay in a bath of oil, in an oil-tight, dust-proof gear case. Crank turns either direction to produce blast; silent running and durable. Supplied with Heavy Nest Ball Tuyere Iron, which is set deep, so a large fire can be produced to take bar work. Head, 140; size hearth, 24x35x3 in.; fan, 12 in.; height, 30 in.

A light weight, medium-sized steel forge.

No.	**143S**	**142S**
Each	**$24.00**	**$22.50**
Hood	Half Hood	Shield
Weight lbs.	145	140

No. 400 Champion Whirlwind Tuyere Irons



The Whirlwind Blast Anti-clinker Heavy Nest Tuyere Iron produces a circular, rotary blast. It will not blow the heat or hot air up and out of the chimney. It concentrates the blast and heat in the tuyere nest, thus making a hotter fire and heating one-third quicker.

It is supplied with a revolving pick to remove the clinkers out of the side slots.

It is 5 inches deep, 8¾ inches wide and 10½ inches long, over all, 12⅜x14¾ inches. Weight, 55 pounds.

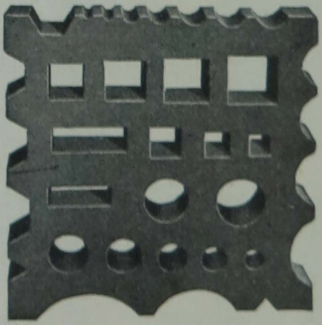
Price, **No. 400** ....each **$10.00**

Blacksmiths' Coal

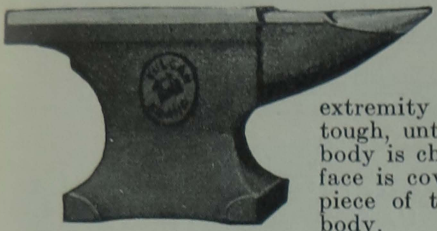
High grade smithing coal for use where the best coal is desired. Can be furnished in any quantity.

Prices upon application.

Cast Iron Swage Blocks



No.	Dimens. Inches	Thick. In.	Price per Lb.	No.	Dimens. Inches	Thick. In.	Price per Lb
1½	12½x12½	4	...	**3½**	16x16	4⅜	....
2½	14⅞x14⅞	4	...	...	......	...	....

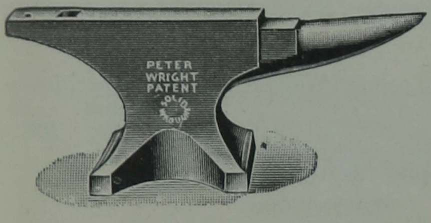


Vulcan Anvils

The horn is covered with, and its extremity made entirely of tough, untempered steel. The body is charcoal iron, and the face is covered with one solid piece of tool steel welded to body.

No.	Approx. Wt., Lbs.	Each	No.	Approx. Wt., Lbs.	Each	No.	Approx. Wt., Lbs.	Each
00	5	$6.00	7	70	$13.00	15	150	$26.00
0	10	7.00	8	80	14.00	16	160	28.00
1	15	7.50	9	90	15.00	17½	175	31.00
2	20	8.00	10	100	16.00	20	200	35.00
3	30	9.00	11	110	18.00	22½	225	38.00
4	40	10.00	12	120	20.00	25	250	40.00
5	50	11.00	13	130	22.00	..	...	.....
6	60	12.00	14	140	24.00	..	...	.....

Peter Wright Solid Wrought Blacksmiths' Anvils



Made from two solid wrought iron forgings, which are welded together at waist of anvil under powerful steam hammers.

The face of top is heavily steeled with Sheffield steel of a special analysis, carefully tempered.

Weight Pounds	Extra Over Base per Pound	Weight Pounds	Extra Over Base per Pound
80 to 349	Base	60 to 69	Base
350 " 600	....	50 " 59	....
70 " 79	....	....	...

Top and Bottom Blacksmiths' Swages

Made of high grade open hearth steel.

The standard shank on the bottom swage is 1 inch.

No. 172, Top

Size Inches	Weight, Pounds Top	Weight, Pounds Bottom	Price Each
¼	1½	2	$1.26
⅜	1½	2	1.26
½	1½	2	1.26
⅝	2	2¼	1.34
¾	2	2¼	1.34
⅞	2½	2½	1.56
1	2½	2½	1.56
1¼	3½	3	1.70
1½	3½	3	1.90
1¾	4	3¾	2.00
2	4	3¾	2.28
2½	5	4½	2.88
3	6	5¼	3.34

No. 173, Bottom

Top and Bottom Blacksmiths' Fullers

Made of high grade open hearth steel.

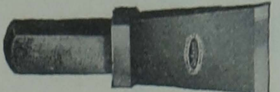
The standard shank on the bottom fuller is 1 inch.

No. 167, Top

Size Inches	Weight, Pounds Each Top	Weight, Pounds Each Bottom	Price Each
¼	2	1½	$1.30
⅜	2	1½	1.30
½	2	1½	1.30
¾	2½	2	1.34
1	2¾	2¼	1.54
1¼	4	3	1.70
1½	4	3	1.90
1¾	4½	3½	2.00
2	4½	3½	2.28

No. 168, Bottom

No. 169 Hardies



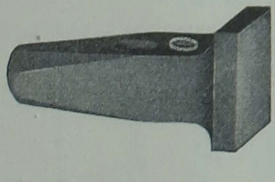
High grade open hearth steel, oil tempered. Order by size of shank.

Shank In.	Bit In.	Wt., Lbs. Each	Price Each
⅝	1¾	1	$.64
¾	1⅞	1½	.72
⅞	2	1¾	.86
1	2⅛	2¼	.96
1⅛	2¼	2¾	1.22
1¼	2⅜	3	1.30

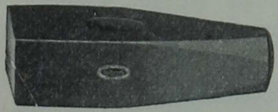
No. 164 Square Blacksmiths' Flatters

For smoothing and finishing flat forgings.

Wt. Lbs.	Face In.	Price Each	Wt. Lbs.	Face In.	Price Each
2½	2	$1.42	6½	3½	$3.34
3½	2½	1.90	7¼	4	4.82
5	3	2.38	...	...	....



No. 163 Blacksmiths' Set Hammers



Made of high grade open hearth steel.

Face Inches	Each	Weight Pounds	Face Inches	Each	Weight Pounds
1¼	$1.22	1½	1¾	$1.90	2¾
1½	1.54	2	...	....	...

Blacksmiths' Punches

No. 165, Round

No. 166, Square

High grade open hearth steel.

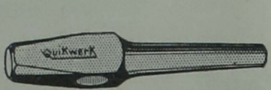
*Diam. Punch Inches	Stock at Eye Inches	Length Inches	Wt., Lbs. Each	Price Each
¼	1⅛	7	1	$1.00
⅜	1⅛	7¼	1¼	1.00
½	1¼	7½	2	1.00
⅝	1⅜	7¾	2¼	1.24
¾	1⅜	8	2½	1.28
⅞	1½	8¼	3	1.42
1	1½	8½	3½	1.70

*On square punches, consider this dimension as the size of square.

No. 179 Backing Out Punches

High-grade open hearth steel, heat treated.

Diam. Face, In.	Each	Length In.	Wt., Lbs. Each
⅜	$.90	7¼	1
½	1.20	7½	1¾
⅝	1.20	7¾	2
¾	1.34	8	2½
⅞	1.52	8¼	3
1	2.25	8½	3½



No. 161 Blacksmiths' Hot Chisels

With Eye for Handle

When ordering, specify stock at eye.

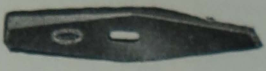
Weight Pounds	Length Inches	Stock at Eye Inches	Bit Inches	Price Each
2	7⅜	1¼	1½	$1.04
2½	7¾	1⅜	1⅝	1.20
3.	8¼	1½	1¾	1.42
5	9¾	1¾	2	2.28
...	...	...	....	....

No. 162 Blacksmiths' Cold Chisels

With Eye for Handle

Weight Pounds	Length Inches	Stock at Eye Inches	Bit Inches	Price Each
2	6	1¼	1¼	$1.04
2½	6½	1⅜	1⅜	1.20
3	7	1½	1½	1.42
5	8	1¾	1¾	2.28

No. 174 Rivet Busters or Side Chisels



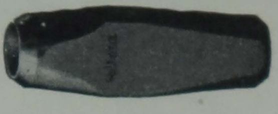
High-grade tool steel, heat treated.

Cutting Edge Inches	Length Inches	Weight Pounds Each	Price Each
1½x⅞	6¼	5	$2.00

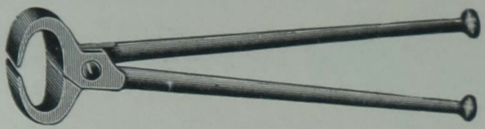
No. 178 Rivet Headers or Sets

High-grade tool steel, heat treated.

Size Rivet Inches	Diameter Cup Inches	Length Inches	Weight Pounds Each	Price Each
½	⅞	5½	2½	$1.80
⅝	1⅛	5¾	3	2.16
¾	1¼	6	4	2.16
⅞	1½	6¼	5	2.66

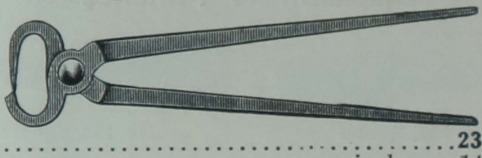


No. 20 Farriers' Pincers



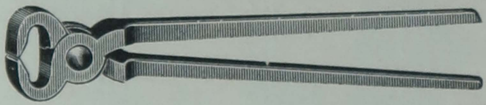
Length.......................inches	16	14	13
No. 20.........................per dozen	$30.00	24.00	22.0
Weight per Dozen...........pounds	40	35	31

No. 23 Farriers' Hoof Parers



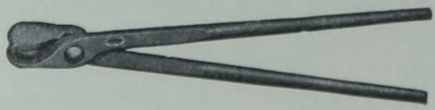
No..	23	23A
Length..................................inches	14	12
Weight..........................per dozen	28	20
Price.............................per dozen	$28.80	24.00

No. 24 Farriers' Cutting Nippers



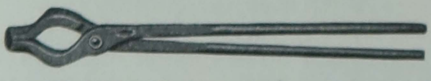
No.........................	24	24A	24B	24C
Length..............inches	14	12	10	8
Weight ....per dozen	28	20	12	8
Per Dozen	$28.80	24.00	19.20	14.40

No. 201 Warren Horseshoer's Tongs



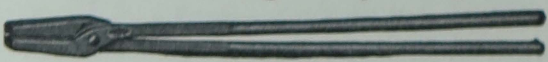
Length..in.	14	16
Each..	$.93	.97
Weight per Dozen..........................lbs.	16	18

No. 202 Bolt or Curved Lip Tongs



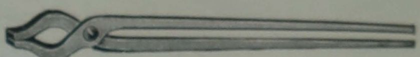
Lgth. In.	Per Doz.	To Hold Rounds, In.	Wt., Lbs. per Doz.	Lgth. In.	Per Doz.	To Hold Rounds, In.	Wt., Lbs. per Doz.
18	$1.29	¼ to ⅜	30	24	$1.58	⅞ to 1	40
20	1.29	½	33	26	1.87	1½	46
22	1.50	⅝ to ¾	36	..	....	....	..

No. 203 Straight Lip Tongs



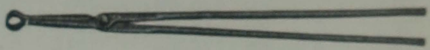
Length Inches	Weight Pounds per Dozen	Each	Length Inches	Weight Pounds per Dozen	Each
16	26	$.99	22	34	$1.14
18	28	1.03	24	39	1.22
20	30	1.08	..	..	....

No. 204 Warren Gad Tongs with Flat Jaws



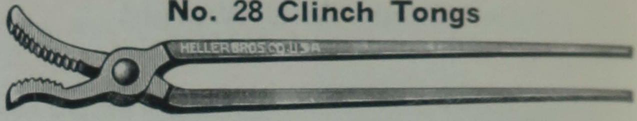
Length..................................in.	18	20	24
Each..	$1.22	1.29	1.48
Weight per Dozen...................lbs.	27	30	38

No. 205 Rivet Tcngs



Length Inches	Weight Pounds per Dozen	Each	Length Inches	Weight Pounds Per Dozen	Each
18	20	$1.74	30	36	$2.04
24	26	1.81	..	..	....

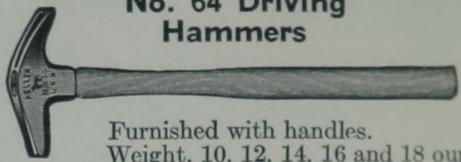
No. 28 Clinch Tongs



Packed ½ dozen in a box. Weight, 12 pounds per dozen.

Length..inches	14
Price, No. 28.................................per doz.	$26.40

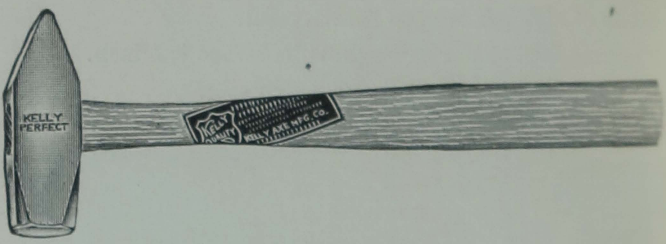
No. 64 Driving Hammers



Furnished with handles.
Weight, 10, 12, 14, 16 and 18 ounces.

Price, No. 64............................per dozen $15.00

Kelly Blacksmiths' Hand Hammers



Made of drop forged, alloy steel with second growth hickory handles. Correct balance and grip.

Polished finish.

Packed 4 in a carton.

Size.......................	0	1	2	3	4
Each.......................	$1.30	1.40	1.55	1.65	1.75
Length Handle..........in.	15½	16½	16½	17½	17½
Weight Head...........lbs.	1½	2	2½	3	3½

No. 86 Straight Pein Blacksmith Sledges

Polished Ends

Weight Pounds	Length Inches	Face Inches	Price Each
6	6½	2⅛	$1.34
8	7	2⅜	1.52
10	7½	2½	1.70
12	8	2⅝	2.08
14	8½	2¾	2.52
16	9	2⅞	2.88

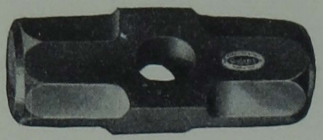
No. 85 Warren Cross Pein Blacksmith Sledges

Polished Ends

Weight Lbs.	Each	Length In.	Face In.
6	$1.34	6½	2⅛
8	1.52	7	2⅜
10	1.70	7½	2½
12	2.08	8	2⅝
14	2.52	8½	2¾
16	2.88	9	2⅞

No. 84 Double Face Blacksmith Sledges

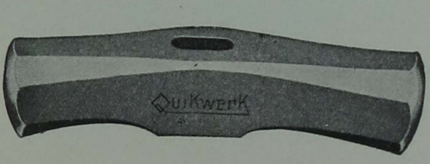
Polished Faces



Weight Pounds	Each	Length Inches	Face Inches	Weight Pounds	Each	Length Inches	Face Inches
5	$1.08	5½	2	14	$2.16	8	2¾
6	1.16	6	2⅛	16	2.52	8¼	2⅞
8	1.34	6½	2¼	18	2.88	8½	3
10	1.62	7	2½	20	3.14	8¾	3⅛
12	1.88	7½	2⅝	24	3.86	9¼	3¼

No. 79 Warren Hand Drilling Hammers

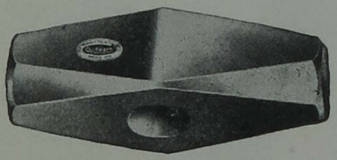
Dago Pattern



Polished faces.

Weight....lbs.	3½	4	4½	5
No. 79....each	$1.16	1.34	1.44	1.52
Length....in.	7	7¼	7¼	7½
Diam. of Face....in.	2	2	2¼	2¼

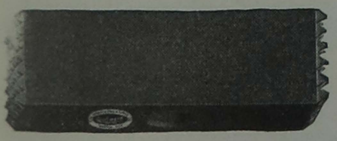
No. 75 Nevada or Long Pattern Striking or Drilling Hammers



Weight Pounds	Each	Length Inches	Face Inches	Weight Pounds	Each	Length Inches	Face Inches
3	$.80	5¼	1⅜	8	$1.34	7¼	1 15/16
3½	.90	5½	1⅜	10	1.62	7¾	2⅛
4	.94	5¾	1½	12	1.88	8	2¼
5	1.08	6¼	1⅝	14	2.16	8¼	2⅜
6	1.16	6½	1¾	16	2.52	8½	2½
7	1.26	7	1⅞	20	3.14	9	2¾

No. 60 Bush Hammers

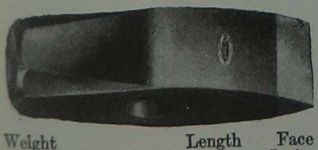
For smoothing surfaces of stone.



Tool steel. All teeth machine cut; 49 one end, 36 to the other.

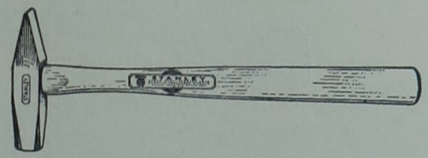
Lgth. In.	Size Steel, In.	Wt. Lbs.	Each
6	1¾	4	$4.00
6¾	2	6	6.00
7¼	2	8	8.00

No. 74 Oval Face Stone Sledges



Weight Pounds	Each	Length Inches	Face Inches
8	$1.34	7¼	2¼
10	1.62	7¾	2½
12	$1.88	8¼	2⅝
14	2.24	8¾	2¾
16	2.52	9¼	2⅞
18	2.88	9½	3
20	3.14	9¾	3
24	3.86	10¼	3¼

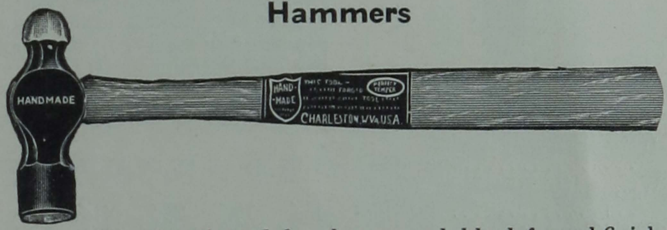
Stanley Atha Plain Eye Riveting Hammers



Polished finish.

No....	230	231	232	233	234	235
Per Dozen....	$12.00	12.60	13.20	13.80	14.40	16.20
Size No....	0	1	2	3	4	5
Length Over All....in.	11	12	12	13	14	14
Standard Package....	6	6	6	6	6	6
Wt., Std. Package..lbs.	2½	4	4½	6	7¾	9¼
Wt., without Hdle...oz.	4	7	9	12	15	18

Kelly Hand Made Ball Pein Machinists' Hammers

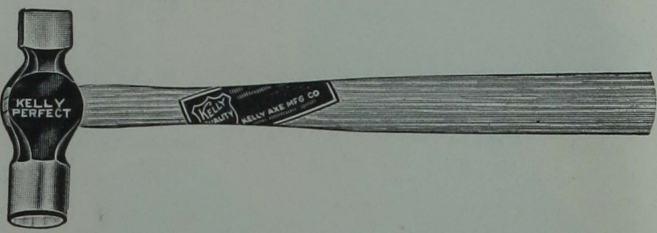


Drop forged tool steel, hand tempered, black forged finish. Seasoned hickory handle.

Packed 4 in a carton.

No.	Size	Each	Lgth. Handle In.	Wt. Lbs. Head	No.	Size	Each	Lgth. Handle In.	Wt. Lbs. Head
6090	0	$.84	15	1	6094	4	$1.10	17½	2
6091	1	.90	15½	1¼	6096	6	1.27	18	2½
6092	2	.96	16½	1½	6098	8	1.48	18	3
6093	3	1.04	17	1¾	....	.	....	....	...

Kelly Straight Pein Hammers



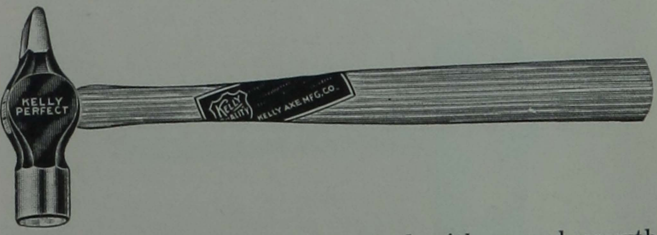
Made of drop forged alloy steel with second growth hickory handles. Has correct balance and grip.

Polished finish.

Packed 4 in a carton.

Size....	2	4
Each....	$1.50	1.75
Length Handle....inches	16½	17½
Weight Head....pounds	1½	2

Kelly Cross Pein Hammers



Made of drop forged, alloy steel with second growth hickory handles. Correct balance and grip.

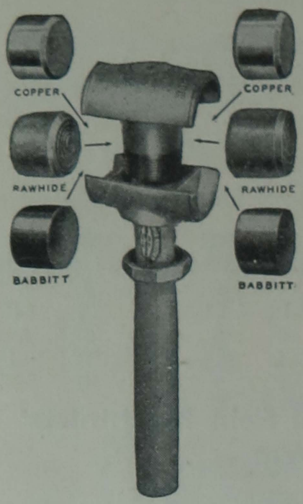
Polished finish.

Packed 4 in a carton.

Size....	2	4
Each....	$1.50	1.75
Length Handle....inches	16½	17½
Weight Head....pounds	1½	2

Basa Hammers

A Blow without a Dent



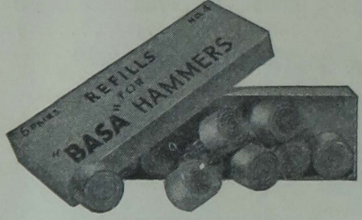
Designed to deliver a hard blow without injuring the surface struck.

The adjustable metal head holds faces firmly; jaws are so recessed as to cause face to mushroom slightly at back and so prevent faces from falling from head due to shrinkage. In addition to the usual wedging, handles are pinned to the head of the hammer. Head is of strong, tough metal; handle is of a fine grade of straight-grained hickory molded to the grip of the worker's hand.

Faces are of special, well-seasoned rawhide, and are so constructed as to insure proper degree of resilience and have a moisture-proof finish; also copper and babbitt faces.

No.	1	2	3	4	5
Without Faces....per doz.	$12.96	16.92	19.68	25.92	30.36
With Rawhide Faces ....per doz.	18.96	24.12	28.80	41.76	52.80
Wt., with Rawhide Faces ....pounds	1¼	1¾	2⅝	4¼	6
With Copper Faces.per doz.	17.96	24.92	31.68	41.92	.....
Wt., with Copper Faces.lbs.	1¾	2½	3⅞	6¹⁄₁₆	.....
With Babbitt Faces ....per doz.	16.96	22.92	28.68	37.92	.....
Wt., with Babbitt Faces ....pounds	1¹⁵⁄₁₆	2¹³⁄₁₆	4⅜	6⅝	.....

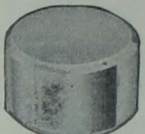
Extra Faces for Basa Hammers



Rawhide

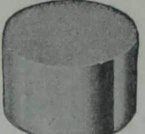
No.	Per Doz. Pair	Size In.
1	$6.00	1¼
2	7.20	1½
3	9.12	1¾
4	15.84	2
5	22.44	2¾

Copper



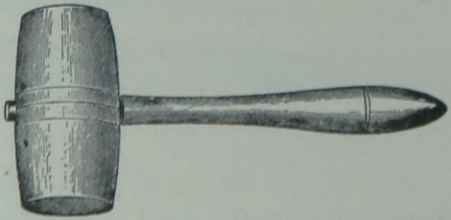
No.	Per Doz. Pair	Size In.	Wt., Lbs. per Pair
1	$5.00	1¼	¹¹⁄₁₆
2	8.00	1½	1⅛
3	12.00	1¾	1½
4	16.00	2	2¼

Babbitt



No.	Per Doz. Pair	Size In.	Wt. Lbs. per Pair
1	$4.00	1¼	¹³⁄₁₆
2	6.00	1½	1⅜
3	9.00	1¾	2⅛
4	12.00	2	2¹³⁄₁₆

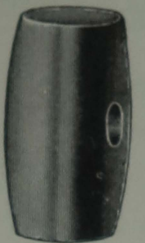
Tinners' Mallets



Made of hickory. Furnished with handles.

No.	Face Inches	Price per Dozen	No.	Face Inches	Price per Dozen
1	2¼x5¼	.....	4	3 x6	.....
2	2½x5½	.....	5	3½x6	.....
3	2¾x5¾	.....	.	.....	.....

Solid Copper Hammers

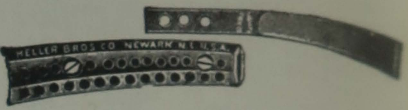


Made from selected pure copper, smooth finish and perfect faces.

Sizes carried in stock without handles: ½, 1, 1½, 2, 2½, 3, 4, 5, 6, 8 and 10 pounds.

Prices upon application.

Adjustable Iron Handle Knives


HELLER BROS CO NEWARK N.J. U.S.A.

Blades ¼, ⅜, ½, ⅝, ¾, ⅞ and 1 inch.

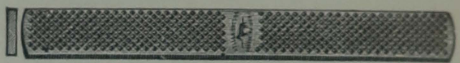
Weight, 4½ pounds.

Packed one dozen in a box.

Price, No. 52, Knives......................	per dozen	$10.00
" " 53, Blades...............	per dozen	8.00

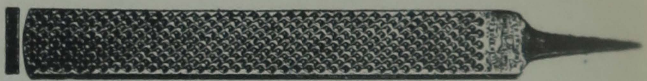
Left hand knives and blades,$2.00 extra.

Slim Arrow Horse Rasps



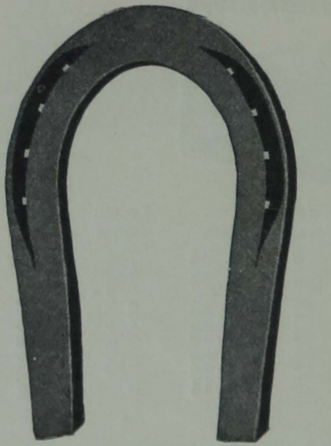
Packed 6 in a box.

Heller Tanged Horse Rasps



Packed 6 in a box.

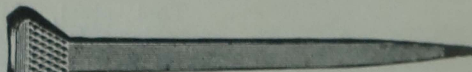
Phoenix Mule Shoes



Packed 100 pounds net in kegs; gross weight, 107 pounds.

	WESTERN PATTERN		EASTERN PATTERN	
Size In.	Weight per Shoe Ounces	Aver. No. in Keg	Weight per Shoe Ounces	Aver. No. in Keg
Jack	6½	246	....	...
00	8	200	....	...
0	9½	169	9½	168
1	13	123	11½	139
2	16½	97	14½	110
3	20½	78	18	89
4	25	64	22½	71
5	28½	56	26½	60
6	31½	51	30½	52
7	36	45	34½	47

Capewell Horseshoe Nails



Sizes 3 to 4½ inclusive are packed in 1-pound packages; sizes 5 to 12, in 5-pound packages.

No..........	3	3½	4	4½	5	6	7	8	9, 10,	11, 12
Lb...........	$.90	.70	.55	.45	.31	.28	.27	.26	.25	.24

R & H Case Hardener

30% Sodium Cyanide

For case hardening and heat treatment of high carbon steel.

Also used as a preheating medium to replace lead where a slight case is not objectionable.

In powdered form, in 1, 5, 10, 25, 50 and 100-pound tins.

Prices upon application.

Kasenit Open Fire Surface-Hardening Compound

Non-Poisonous, Non-Explosive and Non-Inflammable

A rapid compound for surface hardening. May be used with equally good results on all classes of steel, as well as cast, wrought or malleable iron. No special equipment necessary.

KASENIT
Trade Mark
Reg. U. S. Pat Off.
No. 1.

Kasenit No. 1

For fine work and very rapid hardening.

Size Container Pounds	Each	Size Container Pounds	Each
½	$.65	10	$10.75
1	1.20	25	25.25
3	3.40	50	49.50
5	5.65	..	.....

Kasenit No. 2

For general surface hardening.
Quantities Over 25 Lbs...per lb. $.80

E-Z Welding Compound

FOR ALL GRADES OF STEEL
E-Z
WELDING COMPOUND

E-Z Welding Compound sticks to the metal at a low heat and is equally good for lap, split, V, butt or jump welding.

This compound will weld tool, plow, open-hearth, Bessemer or spring steel, making a strong and smooth weld, at a lower heat than any other compound.

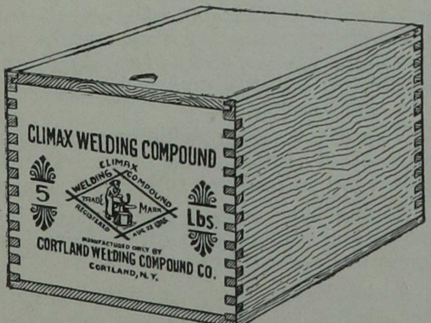
E-Z Compound is used between laps of welds.

1-Pound Boxes	per pound	$.25
5 and 10-Pound Boxes	per pound	.18
25 and 50-Pound Boxes	per pound	.17
100-Pound Drums	per pound	.16½
150-Pound Drums	per pound	.16½
300-Pound Half Barrels	per pound	.15
600-Pound Barrels	per pound	.14½

Climax Welding Compound

Designed for application between laps. Causes steel to weld like iron. Welds steel at lowest possible heat.

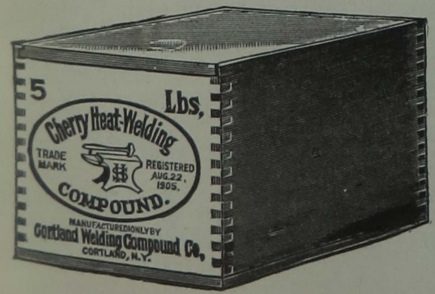
Cap. Lbs.	Style Container	Price per Lb.
1	Box	$.25
5	Box	.18
10	Box	.18
25	Box	.17
50	Box	.17
100	Box	.16½
150	Keg	.16½
350	½-Bbl.	.15
550	1 Bbl.	.14½



Cherry Heat-Welding Compound

For forge welding. Welds steel at the lowest possible heat. Designed for application between laps.

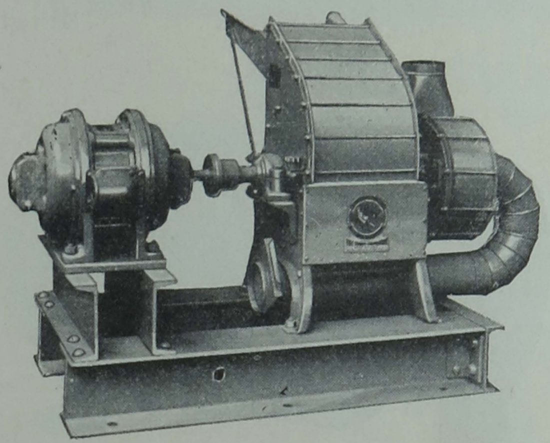
Five and 10-pound boxes packed in cases that hold 50, 100 and 200 pounds; 1-pound boxes in cases of 25 and 50 pounds.



Cap. Lbs.	Style Container	Per Lb.
1	Box	$.25
5	Box	.18
10	Box	.18
25	Box	.17
50	Box	.17
100	Box	.16½
150	Keg	.16½
350	½ Bbl.	.15
550	1 Bbl.	.14½

Jay Bee Grinders

Midget and Junior



This grinder is especially suited to the small plant where it is necessary that one grinder do the work of several. Grinds and pulverizes drugs, chemicals, screenings, small grains, coal, coke, earth, stone, marble, hay, rubber, glue, etc. Also used for grinding roots, herbs, gelatin, spices, coffee, malt, corn meal, whole wheat flour, thyme, packings, asbestos, alum, certified food colors, all dry compounds and almost every product that is grindable.

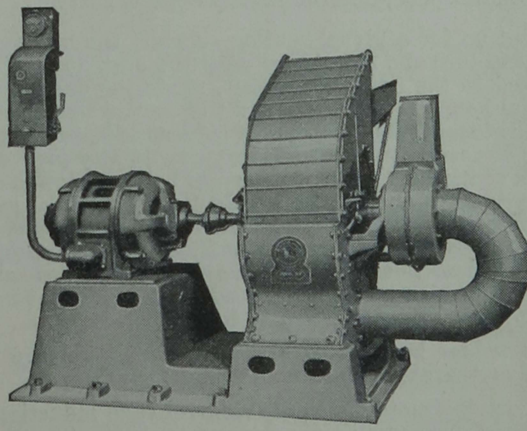
Made of boiler plate and maganese steel. The grinding is done in suspension, that is, the material is ground in mid air by being struck a shattering blow by a battery of indestructible steel hammers.

Can be furnished direct-connected motor driven or belt driven.

Size........	Midget	No. 1 Jr.	No. 2 Jr.	No. 3 Jr.
H.P........	2 to 3	3 to 6	5 to 9	7 to 12
Cap. per Hr....lbs.	100 to 400	150 to 500	300 to 900	400 to 1200

Full information and prices furnished upon application.

Model U-X Jay Bee Feed Grinders



For fine or coarse grinding of all grains and roughage. Any combination of feed can be made from home grown crops.

Heavy boiler plate and alloy steel construction, self-aligning S.K.F. ball bearings enclosed in dust-proof bearing housings. Rockwood drive pulley on belt operated mills. Heavy durable fan assembly; heavy gauge galvanized steel suction pipe.

Screens made in sizes from 1/64 to 1½ inches in diameter. Three screens are standard equipment of each mill.

The grinding is done in the air. Special heavy alloy steel swing hammers strike the material only. No metal touches metal. Multiple cutting knives assure long life of hammers. Friction is entirely eliminated. The grinding is always cool and uniform.

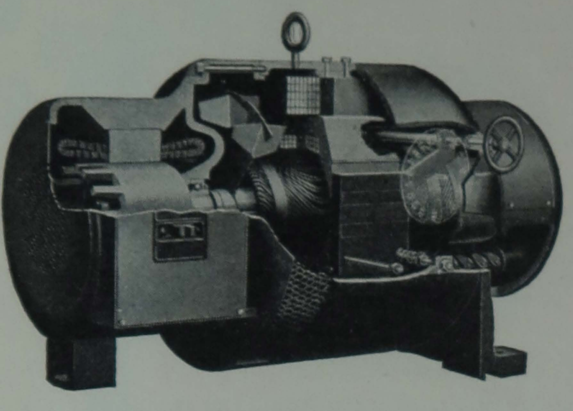
Can be furnished direct-connected motor driven or belt driven.

Size..............................	2	3
H.P. of Belt Driven Mill..............	20 to 30	25 to 40
H.P. of Direct Connected Unit.........	25 & 30	30 & 40

Full information and prices furnished upon application.

Westinghouse FlexArc Welders

Motor Driven—50 and 60 Cycles A.C. and D.C. Drive—200, 300, and 400 Amperes
Belted or Coupled Generators



The FlexArc welder is a sturdy and compact unit which is recommended for general welding service as well as production work. It is suited for welding with bare, coated, or covered electrodes.

The welding generator operates on an entirely new principle of magnetic control, utilizing a magnetic shunt in the armature reaction flux path. By this means, a generator is obtained which has no shunt field and requires no field rheostat, exciter, or external reactor, and yet which has a volt-ampere characteristic closely approaching the ideal. This principle also allows accurate pre-selection of welding current over a wide range by means of a purely mechanical control, eliminating the need for rheostats, series field control schemes, or adjustable brushes.

The output current of the welding generator is adjusted by means of iron leakage plates which are operated by a hand wheel. These plates serve as a magnetic shunt for the reaction flux of the machine, and their position, with respect to the main flux path, determines the welding current.

To set up for a given welding current, the operator has merely to turn the handwheel until the current dial, which is geared to the handwheel shaft, reads the desired value. The dial has a 20-inch scale and the control has an infinite number of steps. This scheme of current adjustment gives a degree of accuracy before unattained. It also provides for smooth continuous variation, springs being placed in such a way as to take up all backlash in the mechanical system. This method of control eliminates the need for meters, which are relatively delicate instruments, subject to damage in severe service. Dial control is more accurate, in view of the greater scale length and also because of the fact that welding current is set before starting to weld.

This welder has a very low open circuit voltage which is always desirable from the viewpoint of safety.

The driving motor is of the squirrel cage induction type with rotor overhung on the generator shaft. The rotor is die cast of aluminum, blowers being cast integral with the rotor bars. The stator core and coils form a prewound stator unit which is pressed into the frame. In case of a burnout, the old unit may be removed and another inserted to minimize delay. Stator coils are dual insulated with individually taped end turns.

The motor starter consists of a Type AB Nofuze Circuit-Breaker mounted alongside the motor. This breaker acts as a start-stop switch and also serves to give overload and short circuit protection.

The 220-volt a.c. sets may be reconnected for 440 volts by changing the motor connections at the conduit box as specified on the nameplate.

The completely stable arc permits a higher average current for a given electrode. Because the arc is so stable, it is possible to deposit more metal in a given amount of time. The arc is free from sputtering, enabling the operator to lay welds of better quality.

The stable arc and closer current control over a wide range insure uniform results on light or heavy work. The uniformity of current is especially important on thin plate where even small fluctuations may cause burning or poor penetration.

Polarity is reversed quickly and easily. Polarity positions are plainly marked.

The smallest copper used in this set is ¼-inch square.

Bearings are completely sealed against grease leakage and infiltration of dust, grit and moisture. They do not require lubrication oftener than once every 6 months.

Machine is completely enclosed in a heavy frame which makes it practically indestructible. It is completely self-contained, eliminating the need for adding detached parts in separate boxes, therefore resulting in an unusually compact construction so essential in a welder.

The 3-wheel type of running gear permits a low center of gravity and short turning radius, with exceptional stability.

Features

Rigid 1-piece shaft gives simplicity and freedom from misalignment. Prewound stator unit can be pressed out and replaced without loss of time. Perforated end plate admits ventilating air but excludes foreign material and is easily removed for cleaning. Dual insulated stator coils. Blowers cast integral with rotor. Indestructible die cast rotor. Small control cabinet with removable cover plate. Laminated iron flux path. Commutating field in pole face. Pre-set dial enables operator to set up welding current with accuracy before starting to work. Leakage plates operated by the current pre-set hand wheel regulate welding current smoothly and accurately over a wide range eliminating need for field rheostat and field taps. Springs take up backlash in gearing, permitting smooth and accurate variation of welding current. Construction of feet makes the addition of running gear simple.

Optional Features

The following are not furnished in the standard bare welding set but may be obtained at a price addition.

The standard portable parts for a.c. Motor-driven welders consist of 2, 16-inch diameter steel tired rear wheels, 1, 10 or 11-inch diameter front wheel, while d.c. driven units have four wheels, and the necessary axles and miscellaneous hardware. Solid rubber tire or pneumatic tire running gear can also be supplied.

To protect welders which must stand out doors in all kinds of weather, sets can be provided with a canopy having a metal top and canvas roll curtains on sides and ends.

A plug type switch can be provided which will change motor and starter connections from 220 to 440 volts and vice-versa in 1 operation.

A metal box containing ammeter, voltmeter, and shunt, for installation by the purchaser can be supplied.

Where a cover for the welding generator terminals is desired, a sheet metal cover is provided which is to be installed by the customer. This cover cannot be used when the meter box is used.

A current reducing resistor will permit welding at current values between 15 and 30 per cent of the generator rating. The standard resistor unit consists of a number of edge wound ribbon resistor tubes assembled on a metal frame. Terminals are provided for connecting the resistor into the welding circuit. These units are to be installed by the purchaser.

A push button operated magnetic starter with no-voltage release may be provided.

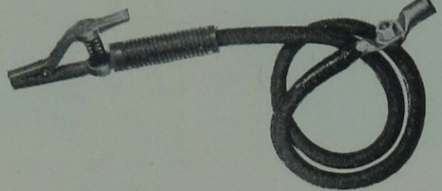
1 Hr. 50° C. Rating Amps.	Current Range	Stationary Set Lgth. In.	Width In.	Ht. In.	Wt. Lbs.	Portable Set Lgth. In.	Width In.	Ht. In.	Wt. Lbs.
200	60–250	41	24	26	1135	44	29	34	1200
300	90–375	48	24	26	1346	50	29	34	1420
400	120–500	48	27	29	1715	50	32	37	1789

Prices upon Application

Westinghouse Electrode Holders

EUREKA HOLDER
PATENTED

Style 942113



Style 856551

Electrode holders are for a.c. or d.c. service where pilot circuits operated from the electrode holders are not required.

Style 706446

Standard metallic electrode holder, similar to Style 856551 except without cable. The jaws are made of light weight steel stampings with provision for gripping the electrode in any position. The spiral springs are oil tempered, not the ordinary hardware type. The annular grooving on the Micarta handle provides a firm, cool grip for the operator's hand.

For the commercial sizes of bare and heavily coated electrode 3/32 to 1/4 inch diameter and currents up to 400 amperes.

Style **706446**..............................each **$2.75**

Style 579238-B

Similar to Style 706446 except with 5-foot cable and connector.

Style **579238-B**..............................each **$5.00**

Style 942548

Similar to Style 706446 except with 15-foot No. 3 extremely flexible cable and connector.

Style **942548**..............................each **$8.00**

Style 942113

Universal electrode holder for light welding, The jaws are made of special drop-forged steel and heat treated and are brazed to cable connections. Furnished with solder type cable connection.

Will handle electrodes 1/16 to 1/4 inch diameter.

Weight, 1 pound.

Style **942113**..............................each **$3.50**

Style 942114

Similar to Style 942113 except provided with quick removable connections.

Style **942114**..............................each **$3.75**

Style 856551

Standard electrode holder for 3/16-inch electrodes and larger. For heavy duty welding service where bare and heavily coated electrodes 3/16 to 3/8 inch diameter and currents above 250 amperes are used. The jaws are cast, designed to withstand heavy currents.

Style **856551**..............................each **$7.00**

Style 942115

Similar to Style 942113 except it is slightly larger and is recommended for medium welding. Solder type cable connection.

Will handle electrodes 3/32 to 5/16 inch diameters.

Weight, 1 pound 7 ounces.

Style **942115**..............................each **$4.00**

Style 942116

Similar to Style 942115 except provided with quick removable connection.

Style **942116**..............................each **$4.25**

Welding Cable

SUPER SERVICE

Super-Service Cable is an all rubber covered cable. This type of cable has exceptional wearing qualities, is waterproof, and can be subjected to the exacting requirements of the welding field with the utmost confidence.

The extra flexible cable, P.D.S. 4878, which is suitable for welding or ground leads, has 3 layers of insulation. A rubber compound of 40 per cent Hevea rubber is applied to the copper followed by a spiral wrap of Seine twine. The outer layer is a compound of 60 per cent Hevea rubber.

The extremely flexible cable, P.D.S. 3554, for use next to the electrode holder, has an inner wrap of cotton yarn, over which a compound of 60 per cent Hevea rubber is applied. This is followed by a spiral wrap of Seine twine and a second layer of the 60 per cent rubber compound.

Types WM-2 and WM-3 welding cable is a smaller and lighter cable which can be used in place of the super service in all but the severest applications. This cable has no insulating rubber, the covering over the strand consisting of a jacket of rubber compound approximately .087 inch thick.

Prices upon application.

Always specify P.D.S. number, A.W-G. number and stranding.

	P.D.S. **3554**, Super-Service, Extremely Flexible		P.D.S. **4878**, Super-Service, Extra Flexible	
Size A.W.G.	Stranding	Per 1000 Feet	Stranding	Per 1000 Feet
3	1323–.0663 (*7x7x 27)	**$315.00**	133–.0201 (19x7 of #24)	**$290.00**
2	1666–.0063 (*7x7x 34)	**345.00**	133–.0226 (19x7 of #23)	**325.00**
1	2107–.0063 (*7x7x 43)	**420.00**	133–.0254 (19x7 of #22)	**400.00**
0	2646–.0063 (*7x7x 54)	**515.00**	259–.0201 (37x7 of #24)	**520.00**
00	3332–.0063 (*7x7x 68)	**605.00**	259–.0226 (37x7 of #23)	**595.00**
000	4214–.0063 (*7x7x 86)	**770.00**	259–.0254 (37x7 of #22)	**690.00**
0000	5292–.0063 (*7x7x108)	**910.00**	259–.0285 (37x7 of #21)	**790.00**

*Of No. 34.

Standard Accessory Set

A standard set of welding accessories consists of the following: 1 operator's helmet; 1 electrode holder with cable; 2, 30-foot lengths of cable with terminals; 1 wire scratch brush; and 1, 50-pound bundle of assorted sizes of welding wire. Put up 1 set in a box.

Style **856164-A**, for 200 Amp. D.C. Welder......each **$25.00**
Style **856165-A**, for 300 D.C. Welder............each **32.00**
Style **856165-A**, for 400 Amp. D.C. Welder......each **38.00**

Westinghouse FlexArc Welding Glass

For metallic electric arc welding. Available in Style 856160 with cover glass and style 856161 with cover glass. No. 10 shade is recommended for general arc welding service; No. 12, for heavier duty welding at higher currents.

Danger ray absorption, ultra violet, 100 per cent; infrared, 99.99 per cent.

Style	**856160**	**856161**
Shade No.	**10**	**12**
Each	**$1.75**	**1.75**
Amperes	75–250	250 or More
Density	3.86	4.71
Visible Light Transmission	.014%	.0019%

Klearsite Non-Pitting Koverglas

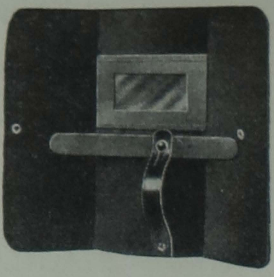
KLEARSITE
KOVERGLAS

Ordinary Glass **Klearsite Koverglas**

Specially processed to prevent pitting. Outlasts plain cover glass. Clear visability; no eye strain. Black, opaque border prevents injurious light rays from passing through edge of welding lenses. Made of select, first quality glass.

Each.. **$.25**

Style 972005 Westinghouse Inspectors' or Observation Shields

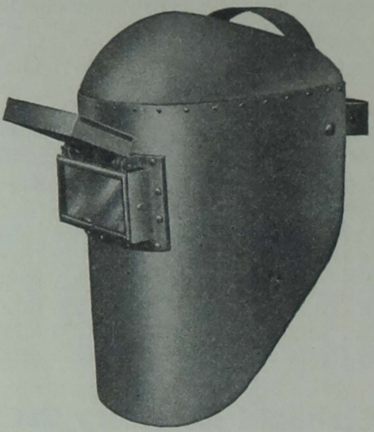


Furnished without lens and cover glass. Made of No. 1 oak hand snuffed grain leather, folding to a width of 5 inches for carrying in pocket.

Glass holder is constructed to accommodate standard size filter and cover glass, making glass replacing simple.

Style **972005** .... each **$3.00**

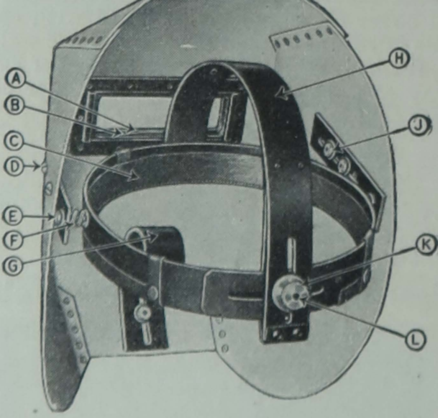
Style 942357 Westinghouse Helmets



Furnished with lens which meets filtering qualities of federal specification; construction is the same as Style 942355. Equipped with a hinged lens holder which may be lifted when operator desires to inspect work. When filter lens is in the open position, a clear glass protects the eyes from flying particles such as encountered in chipping.

Style **942357** .... each **$8.80**

Style 942355 Westinghouse Helmets

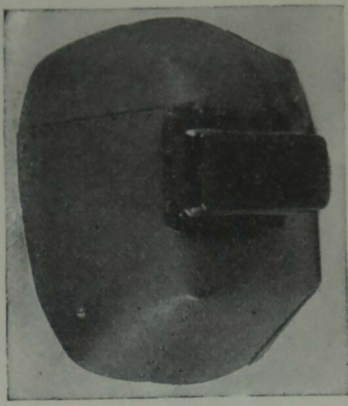


Furnished complete with lens which meets filtering qualities of federal specification. Shaped of 1-piece durable black fiber and fitted with an adjustable fiber head piece and chin rest to hold it firmly in position. Swings upright from face easily and quickly.

A, fiber gasket; B, lens retainer spring; C, sweat pad; D, side screw for arms; E, binder head band screw; F, coil spring; G, chin rest; H, complete headgear; J, side nut for arms; K, knurled nut; and L, binder head screw.

Style **942355** .... each **$6.80**

No. 143 Willson Welding Helmets



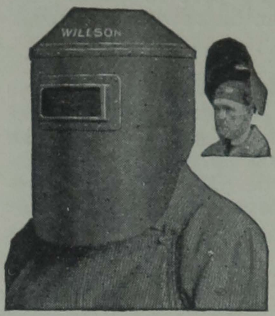
A comfortable, light weight helmet built of riveted black fibre. Deep curved along bottom and sides, it protects the throat from under flashes and the face to a point behind the ears.

The Willson-Weld and clear cover glass may be replaced quickly without tools. Size glass, 2x4¼ inches.

No. **143**	ea.	**$6.30**
Willson-Weld Glass	ea.	1.55
Cover Glass	ea.	.05
Fibre Gasket	ea.	.05
Glass Retaining Springs	ea.	.45

No. 130 Willson Electric Welding Helmets

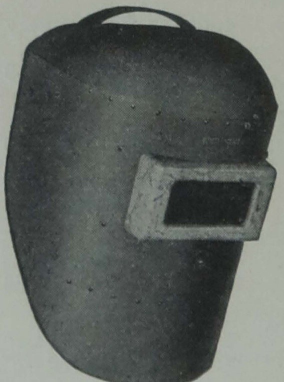
With Willson-Weld Glass



For both carbon arc and metallic arc welding. Used in railroad shops, steel foundries, boiler shops, shipyards, street railway work, and electric welding in general. The Willson-Weld glass is tested to pass requirements of the National Head and Eye Protection Code, the Bureau of Standard recommendations, and safety bodies. This glass cuts down the light and kills harmful rays that blur and burn the eyes. Helmet is of tough fiber. Has rest bar for chin and a springy adjustable headgear.

Price, No. **130** .... each **$7.50**

No. 330 Willson Welding Helmets



This strong, well-built helmet has a glass holder of a fine grade composition which will not warp or bend. It is not a conductor of electricity, therefore will not burn through on accidental contact with live electrode. It is unaffected by moisture or extreme temperatures.

Replacement of Willson-Weld and clear cover glass is simple and quick.

Has a comfortable, adjustable three position headgear.

Packed in individual cartons.

No. **330** .... each **$8.85**

No. 20 Willson Flip Front Welding Helmets

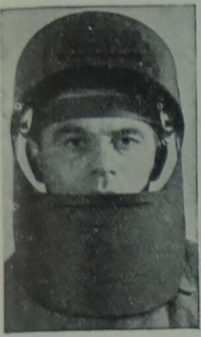
Outer section of composition glass holder with Willson-Weld and clear cover glass, flips up instantly for weld inspection; actuated by springs enclosed in hinge joints. A clear glass in stationary section of holder remains before eyes when front is open.

Glass holder is molded of plastic composition. It is not a conductor of electricity; unaffected by moisture or extreme temperatures.

Packed in individual cartons.

No. **20** .... each **$9.90**

No. 200 Willson Helmets



This is a sturdily constructed helmet of vulcanized, black fibre made so the upper half can be raised to inspect the work.

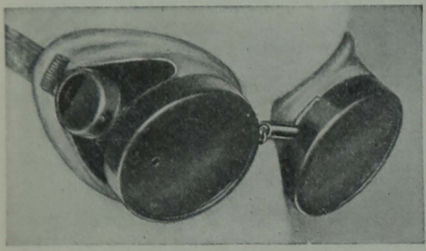
Has a comfortable, adjustable headgear.

The Willson-Weld lenses and clear cover glass are easily replaced without tools.

Packed in a cardboard container.

No. 200	each	**$10.25**

Style RW50 Willson Welding Goggles



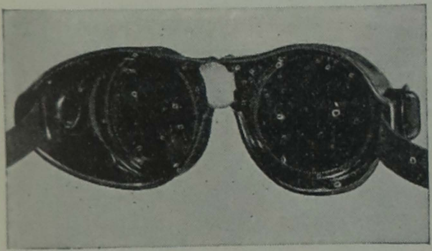
For acetylene cutting and burning.

The brown composition eye cups are anatomically shaped to fit over the orbital cavity and are heat and moisture proof. Ample flow of air is obtained through patented indirect ventilating ports, keeping out injurious light flashes, sparks, etc. All metal parts are treated to resist corrosion. Metallic lens retaining rings are standard. Has adjustable chain bridge, 1-piece adjustable headband, elastic and 50 mm. Willson-Weld lenses.

Packed in a cardboard box.

Style RW50	each	**$2.30**

Style CW1 Willson Cover-All Goggles

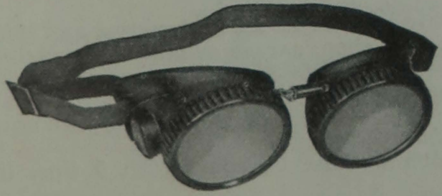


The new Willson Cover-All is comfortable and close fitting, being molded of a light weight composition to the shape of the face.

The material in the cups does not conduct heat and is not affected by moisture. This goggle is roomy and fits right over the worker's correction spectacles. The indirect ventilating ports, while supplying ample air, keep out incandescent sparks and harmful light rays. The Willson-Weld and clear cover lenses are quickly replaceable.

Style **CW1**, Packed in Cardboard Box	each	**$2.30**

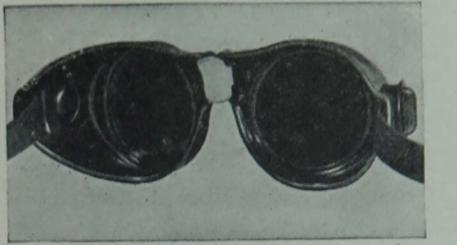
No. 16 Oxweld Welders' Goggles



Light; well ventilated; comfortable. Furnished with Type AA special flat-ground and polished green lens, light, medium and dark. Screw cap permits quick changing of lenses. Lenses protected by clear cover glass.

No. **16** with Type AA Lenses	per pair	**$2.50**
Type AA Green Lenses	per pair	**1.20**
Cover Glasses	per pair	**.20**
Head Bands	each	**.15**
Chain Bridge	each	**.15**

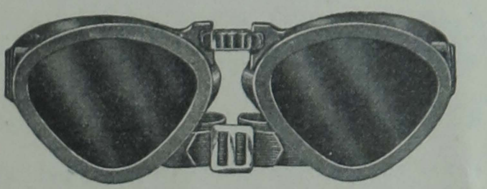
Style CW50 Willson Cover-All Welding Goggles—Indirect Ventilation



A light weight, composition goggle for use with or without correction spectacles. With 50 mm. Willson-Weld lenses with clear bevel edged cover lenses. Black composition cups; adjustable leather bridge; two-piece elastic headband.

Style CW50	each	**$2.80**
50 mm. Willson-Weld Lenses	per pair	**1.30**
50 mm. Clear Cover Lenses	per pair	**.10**
Two-Piece Adjustable Elastic Headband	each	**.12**

No. L1 Willson Welding Goggles



A triangular goggle, comfortable, well ventilated, nonconductive, durable and protective. No sparks or injurious light can reach the eye through the indirect ventilators. Headband and bridge are easily adjusted. Equipped with Willson-Weld glass protected by uncolored cover glass.

When ordering, specify shades of Willson-Weld glass as follows: No. 4 shade, for burning and cutting in dark place; No. 6, for burning and cutting in light place; No. 8, for light welding; No. 10, for heavy welding.

No. L1, in Individual Cardboard Box	each	**$2.80**

Willson-Weld Glass

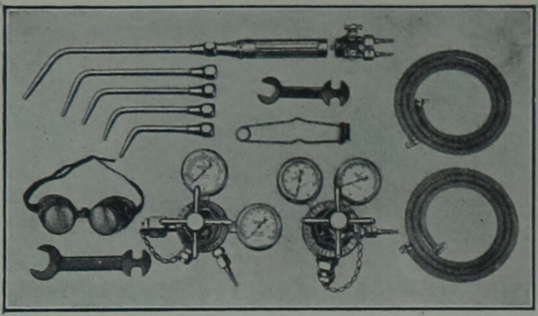
This glass gives the assurance of protection against all dangerous light rays.

Specify shade number of glass desired when ordering any devices which are to carry Willson-Weld Glass.

Shade No.	Recommended Uses	Transmission Percentage Dangerous Infra-Red	 Ultra-Violet	 Visible and Non-Injurious
3	Heating Furnaces, Welding Observation, Lead Burning and Other Work Involving Low Temperatures	1.0	1.0	13.9
4	For Light Acetylene Welding and Cutting in Dark Places, Smelting Furnace Work	*.1	.00	5.18
5	For Acetylene Cutting and Welding	*.05	.00	1.93
6	For General Maintenance Work at Acetylene Welding and Cutting Operations	.00	.00	*.72
8	For Heavy Acetylene Welding and for Electric Welding Up to 20 Amperes, Also Carbon Arc Observation	.00	.00	*.10
10	For Electric Arc Welding Operations Up to 200 Amperes	.00	.00	*.0139
12	For Electric Arc Welding Operations Over 200 Amperes, Also Atomic Hydrogen Welding	.00	.00	*.0019

*Of one per cent.

No. W-105 Prest-O-Weld Heavy Duty Welding Outfits



For all general welding operations this heavy duty welding outfit is ideal. Because of its simplicity, efficiency and portability, it is particularly suitable for garages, blacksmiths, machine, boiler and welding shops and all manufacturing plants where quick, economical repairs of broken, worn or defective parts are required. Popular with plumbers, steamfitters and general contractors.

Outfit consists of:

No. W-105 welding blow-pipe with 5 tips, lighter and wrench.

No. R-109 oxygen regulator with 100 and 3000-pound gauges and wrench.

No. R-103 acetylene regulator with 30 and 350-pound gauges.

12½ feet ¼-inch green oxygen hose.

12½ feet ¼-inch red acetylene hose.

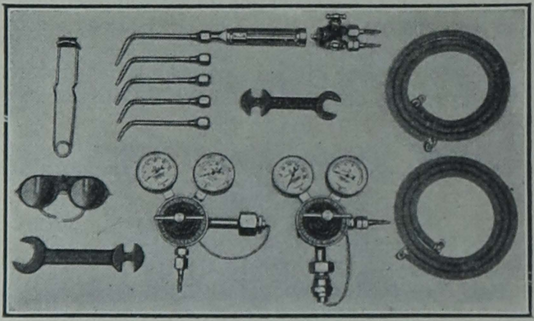
Four ¼-inch hose clamps.

One pair No. 16 goggles.

Manual of Instructions.

No. W-**105** Welding Outfit Complete...........each **$75.00**

Type W-106-B Prest-O-Weld Welding Outfits



This outfit is recommended for auto body and fender work, and the manufacture of sheet metal products such as furniture, ventilators, skylights, cornices, window frames and sashes, barrels, tanks, heating furnaces, cooking utensils, etc.

Type W-106-B Outfit consists of the following:

Type W-106 blowpipe with 5 tips, lighter and wrench.

Type R-106 oxygen regulator with 50-pound and 3000-pound gauges and wrench.

Type R-107 acetylene regulator with 30-pound and 350-pound gauges.

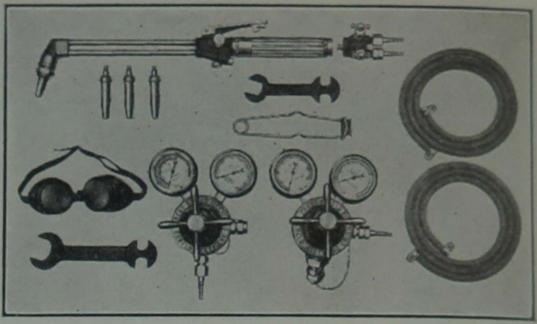
Two 12½-foot lengths 3/16-inch hose with hose clamps.

One pair No. 15 spectacles.

Manual of instructions.

Type W-**106**-B Outfit Complete................each **$53.00**

No. C-105 Prest-O-Weld Cutting Outfits



Cutting equipment is indispensable to the scrap dealer, foundryman, structural steel worker, general contractor, boiler maker, plumber, steam fitter, job welder and garage man. It offers the easiest, quickest and most satisfactory means of severing steel and wrought iron. Because of its speed and economy it is a most important factor in modern industry.

Will cut steel or wrought iron up to 12 inches in thickness.

The efficiency of design of this cutting outfit, and its great portability and convenience has made it popular.

Outfit consists of:

No. C-105 cutting blowpipe with Nos. 1, 2, 3 and 4 nozzles, lighter and wrench.

No. R-102 oxygen regulator with 400 and 3000-pound gauges and wrench.

No. R-103 acetylene regulator with 30 and 350-pound gauges.

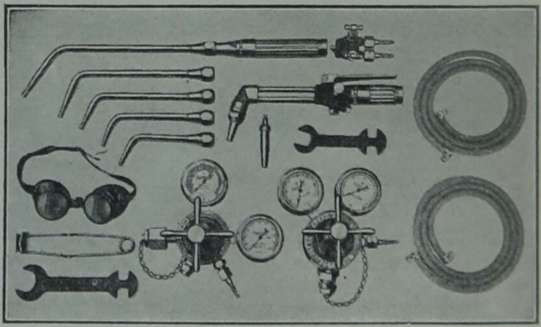
Two 25-foot lengths of ¼-inch hose with hose clamps.

One pair of No. 16 goggles.

Manual of instructions.

No. C-**105**, Complete..........................each **$99.00**

Prest-O-Weld Combination Welding and Cutting Outfits



This combination includes the same apparatus as the No. W-105 welding outfit with the addition of the No. CW-105 cutting attachment.

This outfit will handle all the welding and cutting of the ordinary repair shop, garage or manufacturing plant where it is not necessary to do the welding and cutting at the same time. When mounted on a 2-wheel truck, it is ready for instant use anywhere—in the shop, in the yard or in the field.

The outfit consists of the following:

No. W-105 welding blowpipe with 5 tips, lighter and wrench.

No. CW-105 cutting attachment with 2 nozzles.

No. R-109 oxygen regulator with 100 and 3000-pound gauges and wrench.

No. R-103 acetylene regulator with 30 and 350-pound gauges.

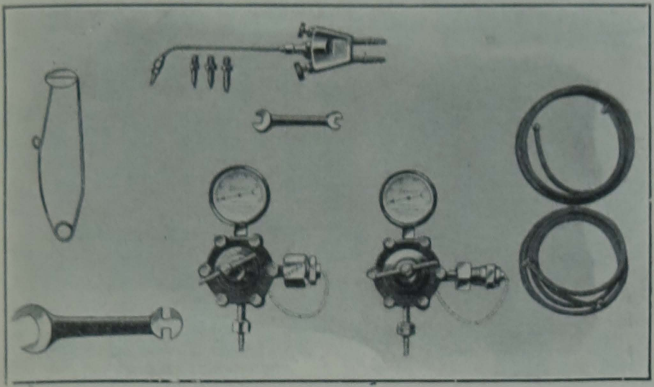
Two 12½-foot lengths of ¼-inch hose with hose clamps.

No. 16 goggles.

Manual of instructions.

Combination Outfit Complete.................each **$96.00**

Type W-103 Prest-O-Weld Lead Burning Outfits



The W-103 Lead Burning Outfit is used not only by garages and service stations for repairing storage batteries but also by storage battery manufacturers in their production processes. It is also used for welding fenders, bodies, radiator, and light sheet metal.

The blowpipe is easily manipulated as it weighs but 5 ounces.

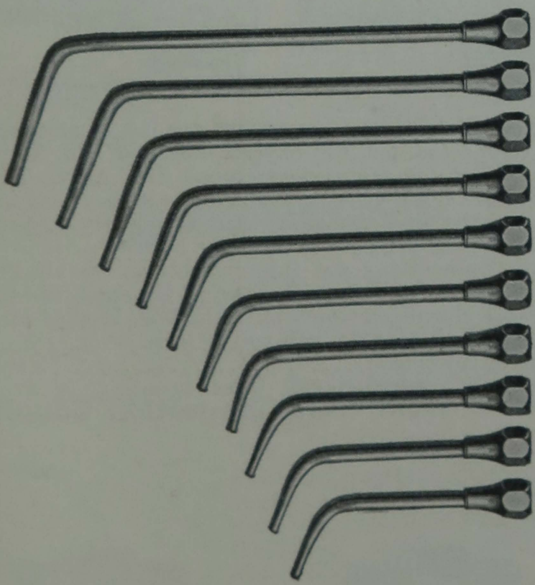
Adaptable to a wide range of work, yet the gas consumption is so small that it is almost negligible.

The outfit consists of the following:

One Type W-103 lead burning blowpipe with four tips.
One Type R-8 oxygen regulator with 50-pound gauge.
One Type R-10 or R-10A acetylene regulator with 50-pound gauge.
Two 12½-foot lengths of 3/16-inch hose.
Four hose clamps.
Instruction booklets.
Wrenches.

Type W-**103**, Complete	each	**$28.25**
Fibre Carrying Case, Extra	each	**3.00**

Prest-O-Weld Tips for Type W-105 Welding Blowpipes

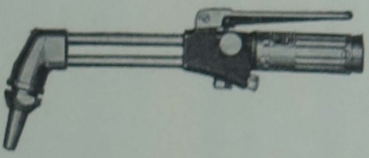


Made in 11 sizes: Nos. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13.

Nos. 4, 6, 8, 10, and 12 tips are furnished as standard.

Nos. **3, 4, 5** or **6** Copper Tips	each	**$2.25**
Nos. **7** or **8** Copper Tips	each	**2.50**
Nos. **9** or **10** Copper Tips	each	**2.75**
Nos. **11, 12** or **13** Copper Tips	each	**3.00**

No. CW-105 Prest-O-Weld Cutting Attachments



Intended for the small shop that does occasional cutting. For use with Nos. W-105 or W-106 blowpipe. New design allows better provision for pre-heating oxygen and obviates backfiring. The cutting oxygen tube is made of ambrac to afford stiffness. Cutting nozzles have a conical design so that the seat will not become nicked or damaged if nozzle is accidentally dropped. Furnished as standard with 75-degree angle head, but can be furnished with 90-degree head.

No. CW-**105**, with 2 Nozzles.................each **$21.00**

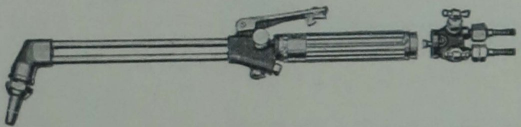
No. W-105 Prest-O-Weld Welding Blowpipes

Has detachable valve body to which handle is attached by simple locking device. Enables operator to change easily and quickly to smaller blowpipe handle, cutting attachment or full size cutting blowpipe without detaching hose or connections, or using a wrench. One-piece hard-drawn copper tips. These are manufactured at an angle of 60 degrees but can be changed to any angle desired. Eleven different size tips, Nos. 3 to 13 inclusive, are available for this blowpipe. Standard equipment: Nos. 4, 6, 8, 10 and 12 tips, lighter and wrench.

No. W-**105** Blowpipe Complete	each	**$27.00**
No. W-**105**, without Detachable Valve Body	each	**19.00**

No. C-105 Prest-O-Weld Cutting Blowpipes

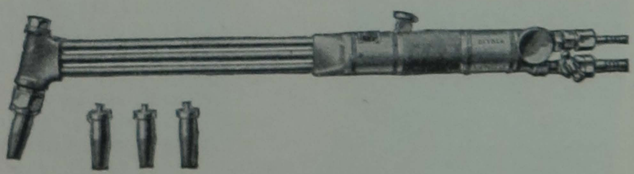
With Detachable Valve Body



This is a heavy duty cutting blowpipe. It will cut metal up to 12 inches or more in thickness. It will operate under the most severe working conditions without backfiring. The cutting oxygen valve which is of the plunger type, closes with instead of against the pressure. Very easy to operate because of the length and convenient position of the valve lever. Valve can be locked open when making long cuts. Weighs slightly over 3 pounds. Furnished with Nos. 1, 2, 3 and 4 nozzles, lighter and wrench. 75-degree angle head but 90-degree can be provided.

No. C-**105** with Detachable Valve Body	each	**$42.00**
No. C-**105** less Detachable Valve Body	each	**34.00**

Type C-101 Prest-O-Weld Cutting Blowpipes

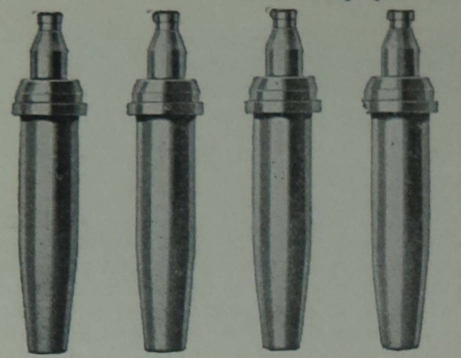


Built to withstand the rough treatment frequently accorded a cutting blowpipe. The acetylene tube (upper) is brass-sheathed seamless steel, giving rigidity without adding weight. The cutting valve is controlled by a lever so conveniently placed that it can be operated by the thumb without deflection of the cutting jet.

Fitted with 4 one-piece chromium-plated copper nozzles.

Type-C-**101**, with Four Nozzles, Lighter and Wrench ....each **$42.00**

Prest-O-Weld Nozzles for No. C-105 Cutting Blowpipes

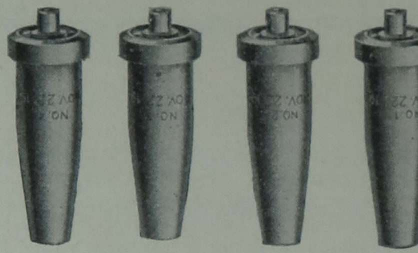


There are five 1-piece copper nozzles numbered 0, 1, 2, 3 and 4 for the C-105 cutting blowpipe. They have a conical seat so designed that it is not easily nicked or damaged if the nozzle is dropped or tossed into a tool box.

Nozzles Nos. 1 and 2 also fit CW-105 cutting attachment.

Nozzles for No. C-105 Blowpipes...............each **$2.25**

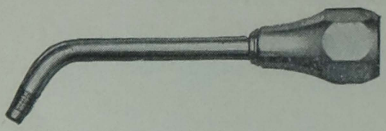
Nozzles for C-101 Cutting Blowpipes



These nozzles are of the one-piece type. They are made in 5 sizes—Nos. 0, 1, 2, 3 and 4.

Price.......................................each **$2.25**

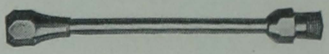
Type W-105 Prest-O-Weld Stem Tip Adaptors



Permits the use of small W-107 tips on the W-105 blowpipe. Intended for use when calls for light welding are only occasional.

Type W-**105**, Adaptor for W-107 Tips............each **$1.50**

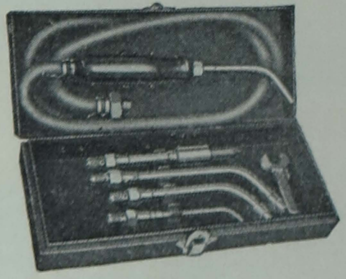
Type W-105 Prest-O-Weld Tip Extensions



This tip extension enables the operator to lengthen the W-105 welding blowpipe 8 inches and thus work more comfortably away from the heat of a large preheated casting.

Type W-**105**...................................each **$2.25**

Prest-O-Lite 5-In-1 Outfits



Combines five-torch utility in one compact unit. Uses acetylene only; no oxygen required.

The torch stems in this outfit are used for soldering copper pipe and fittings, mechanical refrigeration repair, for installing and servicing air conditioning systems, melting metal, thawing pipes, etc.

In addition it includes a soldering copper which is useful for light to medium tin work. The flame is entire-enclosed. It heats quickly and keeps an even temperature.

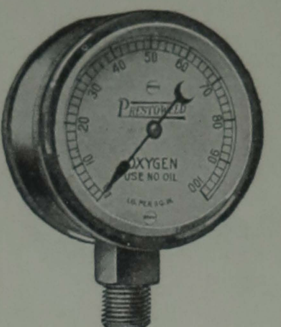
Packed in a durable metal case with snap lock. Spring clips protect parts from loss or damage.

Complete Outfit.............................each **$9.00**

Prest-O-Weld Gauges

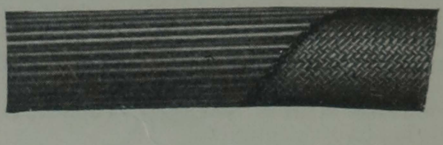
Inlet nipples have ¼-inch standard pipe threads.

All brass gauges have beveled glass crystals. Steel gauges have black enamel finish and plain crystals.



Description	Price Each
2½-Inch Pressed Brass	
3000-Lb. Oxygen, 100-Lb. Grad............	$5.00
400-Lb. Oxygen, 10-Lb. Grad.	3.00
100-Lb. Oxygen, 2-Lb. Grad.	3.00
350-Lb. Acetylene, 10-Lb. Grad.	3.00
30-Lb. Acetylene, 1-Lb. Grad.	3.00
2-Inch Pressed Brass	
3000-Lb. Oxygen, 100-Lb. Grad.	$4.50
50-Lb. Oxygen, 1-Lb. Grad	2.50
350-Lb. Acetylene, 10-Lb. Grad ..	2.50
30-Lb. Acetylene 1-Lb. Grad.	2.50
2½-Inch Pressed Steel **⅛-Inch Inlet Nipple**	
50-Lb. Oxygen or Acetylene, 1-Lb. Grad.	$2.00

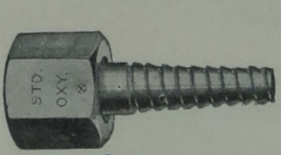
Oxweld Welding Hose



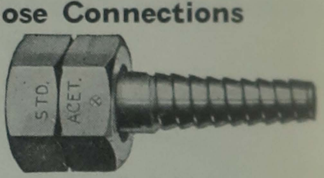
Light, durable and pliable. Green for oxygen. Red for acetylene. In 12½, 25 and 50-foot lengths.

Size Inches	Description	Per 100 Feet
¼	2-Braid, Corrugated Green Oxygen.............	$15.40
¼	2-Braid, Corrugated Red Acetylene............	15.40
¼	3-Braid, Corrugated Green Oxygen............	18.48
¼	7-Ply Green Oxygen, in 25 or 50-Foot Lengths Only..................................	18.48
⅜	2-Braid, Corrugated Green Oxygen............	18.48
⅜	2-Braid, Corrugated Red Acetylene............	18.48
3/16	1-Braid, Corrugated Green Oxygen............	10.78
3/16	1-Braid, Corrugated Red Acetylene............	10.78

Prest-O-Weld Hose Connections



Oxygen



Acetylene

Prest-O-Weld Hose Connections are I.A.A. standardized, with right-hand nut for oxygen stamped Std. Oxy., and left-hand nut for acetylene stamped Std. Acet. The hose nipples have spiral grooves which make it very easy to insert them into the hose but which hold so securely that it is impossible for the pressure to blow the hose off.

These connections are interchangeable on all Prest-O-Weld regulators and blowpipes except the small W-14, W-103 and W-107 blowpipes which have the hose nipples attached.

Made in two sizes, ¼ inch and 3/16 inch.

Oxygen or Acetylene..........................each **$.40**

Prest-O-Weld Hose Connection Couplings

Right-hand threads.

For coupling two lengths of oxygen hose having I.A.A standarized connections.

Each................. **$.35**

Left-hand threads.

For coupling two lengths of acetylene hose having I.A.A. standarized connections.

Each.................. **$.35**

Clamp

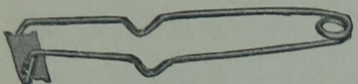
Hose Clamps and Ferrules

Ferrule

Prevent pressure blowing hose off nipples. Will not cut the rubber.

Clamps, 3/16, ¼ and ⅜-Inch	each	$.07
Ferrules, 3/16, ¼, 5/16 and ⅜-Inch	each	.15

Prest-O-Weld Friction Lighters

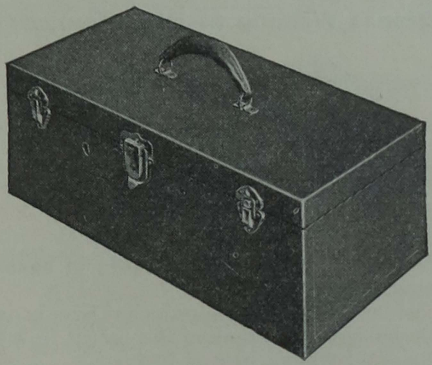


This friction lighter saves time and the bother with matches.

Movable file increases life of lighter several times.

Each		$.15
Large Renewal Tips	each	.10

Prest-O-Weld Carrying Cases



Designed to prevent loss of tips, wrenches, goggles, etc. Substantially made with high grade brass fittings.

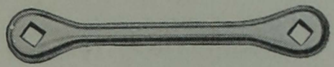
Steel Cases

Size 9x10x21 Inches for No. W-105, C-101 or C-105 Outfits	each	$6.00
Size 7x9x17 Inches for No. W-105-A or W-106-B Outfits	each	4.50

Fibre Cases

Size 5½x10½x13½ Inches for No. W-103, W-106 or W-107 Outfits	each	$3.00

No. L-505 Prest-O-Lite Tank Keys



For A, B, E or MC tank valves.

No. L-505 Key	each	$.05

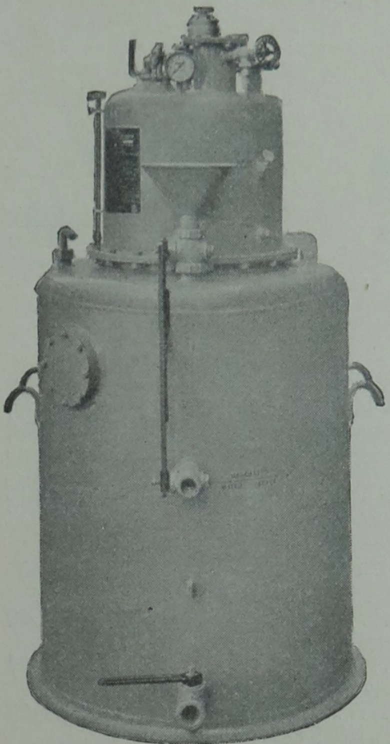
No. T-2 Oxygen and Acetylene Cylinder Trucks

For portability and convenience of welding or cutting outfit. Prevents cylinders being knocked over with resultant breakage of regulators. Accommodates any size cylinders.

Has tool box and adjustable axle; takes either 14 or 24-inch steel wheels; 24-inch wheels have grease cup lubrication.

Size Wheels...in.	24	14
No. T-2, Complete...ea.	$21.00	$18.00
Extra Wheels ....per pr.	8.00	5.00
Extra Axles...ea.	2.50	2.50

Oxweld MP-6 Portable Acetylene Generators



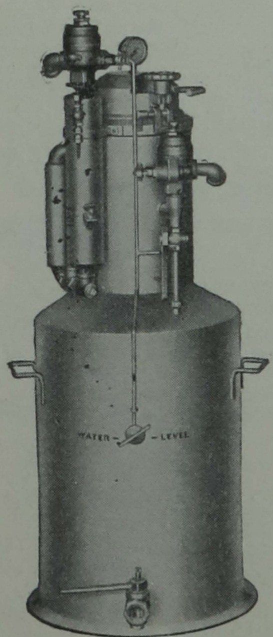
Medium pressure, 50-lb. carbide capacity, uses ¼x12-in. size carbide. Can be used with any make welding or cutting blowpipe and generates acetylene from calcium carbide.

Enclosed design gives protection to working mechanism. No clock motor or other complex feeding device. Carbide is fed to water by a gravity feed type valve controlled by a super-sensitive rubber diaphragm on which pressure is exerted by a long compression spring. A hand wheel on top of dome permits control of pressure from 1 to 14 lbs. per sq. in.

Largely of welded construction, with large pipes and clean-out plugs for easy cleaning.

No.		MP-6
Each (for Portable use)		$195.00
Height	inches	62
Width Water Shell	inches	29½
Weight, Empty	pounds	415
Weight, Fully Charged	pounds	890
Shipping Weight	pounds	580
Generating Capacity, Per Hour	cubic feet	100

No. CMP-1 Oxweld Portable Acetylene Generators



A medium pressure acetylene generator designed for portable use.

Strong construction, having pressed steel parts and galvanized steel sheets, bronze-welded for permanence and tightness.

Generates acetylene from Carbic which is high grade calcium carbide, processed and compressed into briquets. This form of carbide is most convenient to handle and saves time in charging the generator.

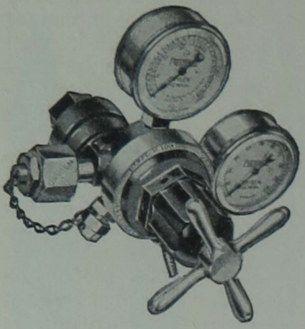
Generator will take eight cakes of Carbic at a single charge and produce approximately eighty cubic feet of acetylene from one charging. This is sufficient to operate a welding blowpipe continuously on average work for several hours.

After charging and establishing the desired pressure, the generation of acetylene is entirely automatic.

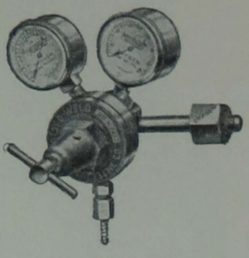
Meets all safety requirements. Listed as standard by the Underwriters' Laboratories.

No.		CMP-1
Each		$95.00
Height	inches	52
Diameter Water Shell	inches	17¼
Water Capacity	gallons	14¾
Weight, Empty	pounds	120
Weight, Fully Charged	pounds	265
Shipping Weight	pounds	170
Charge (No. 20 Carbic Cakes)		1 to 8
Capacity, Per Hour	cubic feet	45

Prest-O-Weld Regulators



No. R-109



No. R-106

Nos. R-102, R-103 and R-109 are stem type regulators, the R-109 having two stages of pressure reduction. Nos. R-106 and R-107 are small regulators of the sleeve and nozzle type. Nos. R-8, R-10 and R-10A are of small size and capacity, for lead burning, decarbonizing and light welding operations.

No.	Description	Each
R-109	Oxygen Regulator with 100 and 3000-Pound Gauges	$24.00
R-102	Oxygen Cutting Regulator with 400 and 3000-Pound Gauges	27.00
R-103	Acetylene Regulator with 30 and 350-Pound Gauges	21.00
R-106	Oxygen Regulator with 3000-Pound Cylinder Pressure Gauge and 50-Pound Working Pressure Gauge	18.00
R-107	Acetylene Regulator with 350-Pound Cylinder Gauge and 30-Pound Working Pressure Gauge	15.00
R-8	Oxygen Regulator with 50-Pound Gauge each	11.00
R-10	Acetylene Regulator with 50-Pound Gauge	11.00
R-10A	Acetylene Regulator with 50-Pound Gauge	11.00

Oxweld Fluxes

Oxweld
FERRO FLUX

Description	Size Can, Lb.	Price ¼ Lb.	Price per Lb.
Ferro Flux for Cast Iron	1	....	$.75
Brazo Flux for Brass, Bronze, Copper or Malleable Iron	1	....	.85
Aluminum Flux for Aluminum	¼	$.50	2.00

Anti-Borax Oxy-Acetylene Welding and Brazing Fluxes

ONE POUND
ANTI-BORAX
WELDING
FLUX

Welding fluxes prevent oxidation, eliminate blow holes, etc. Brazing fluxes cause spelter to penetrate deeper into joint.

ONE POUND
ANTI-BORAX
BRAZING
FLUX

No.	Description	Per Pound 1-Lb. Can	Per Pound 5-Lb. Can
1	Cast Iron Welding Flux	$.45	$.40
2	Brazing Flux, for Brass, Bronze, Steel, Malleable Iron, Etc	.50	.45
3	Brass or Bronze Welding Flux	.50	.45
4	Braz-Cast Flux for Bronze Welding Cast Iron	1.25	...
7	Steel Welding Flux	.45	.40
9	Stainless Steel Flux for Steel Containing Chromium, Copper or Nickel	2.00	...

No.	Description	Each ¼-Lb. Can	Each ½-Lb. Can	Each 1-Lb. Can
5	Extra Quality Cast Aluminum Welding Flux	$.75	$1.40	$2.50
4	Braz-Cast Flux for Bronze Welding Cast Iron	....	.75	....
*8	"A.B.C." Sheet and Wrought Aluminum Welding Flux	.75	1.40	2.50

*No. 8 is furnished in bottles instead of in cans.

Smith's A-Mal-Gam No. 1 Flux

For Bronze Welding at Low Temperature

SMITH'S
A-MAL-GAM
FOR WELDING CAST IRON WITH BRONZE

A black flux which forms a perfect bond between cast iron and bronze and enables the operator to quickly repair cast iron parts such as cylinder heads, crank cases, boilers and gears without the necessity of preheating.

Packed in a moisture-proof, non-tipping, 1-pound purple metal container.

No. **N-51**, A-Mal-Gam No. **1**................per pound $1.50

Smith's A-Mal-Gam No. 2 Flux

For Bronze Welding at High Temperature

SMITH'S HI-TEMPERATURE
A-MAL-GAM No 2
FOR WELDING CAST IRON WITH BRONZE

A red flux which makes strong welds in cast iron with bronze welding rod.

Forms a perfect bond even though cast iron is overheated. Sticks to the welding rod, makes the metal flow freely and leaves a clean weld with a bright surface.

Packed in a moisture-proof, non-tipping, 1-pound red metal container.

No. **N-62**, A-Mal-Gam No. **2**...............per pound $1.50

Smith's A-Mal-Gam No. 3 Flux

For All Kinds of Brazing

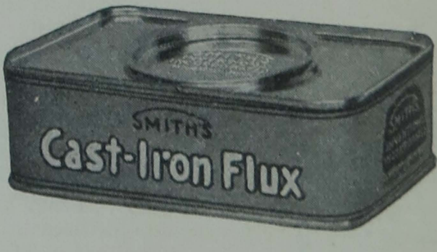
SMITH'S
A-MAL-GAM No 3
FOR STEEL MALLEABLE, COPPER AND BRASS

A cream-colored flux used in brazing steel, malleable iron, brass, copper and galvanized iron. It causes the welding rod to flow freely at low temperatures and leaves a clean, bright surface.

Packed in a moisture-proof, non-tipping, 1-pound yellow metal container.

No. **N-61**, A-Mal-Gam No. **3**...............per pound $.75

Smith's Cast Iron Flux



For removing impurities, oxide, sand, etc., found in welding iron castings. Makes a weld of fine, close-grained texture. Finished work easily machined. Almost no shrinkage.

Put up in one-pound cans.

Price, One-pound Can.........................each $.50

Swedox Welding Rods and Wires

Sul No. 6E for Electric Welding

Coils, 14 and 36-inch lengths.

A pure iron rod with an exceptionally low percentage of carbon, phosphorus and sulphur, conforming to the American Welding Society's specification E-No. 1A. Recommended for welding boilers, steel barrels, tanks, flues, pipe lines; in fact, for any class of welding in thin sheets and especially where maximum ductility and minimum porosity is required.

Sul No. 6E is especially recommended for overhead work and enables the welder to secure deep penetration, and the weld will show a high tensile strength and a high degree of ductility.

Sul No. 18E for Electric Welding

Coils, 14 and 36-inch lengths.

A medium carbon bare electrode low in phosphorus and sulphur. This electrode is intended for the heavier classes of steel welding such as engine frames, side plates, fish plates and general street railway and railroad work. It is also especially recommended for filling in steel castings. This rod conforms to the specifications of a large number of the railroads and also to the American Welding Society's specification E-No. 1B.

No. 110E or G for Acetylene or Electric Welding

Lengths, 14 and 36 inches.

A high carbon rod with a low percentage of impurities, and is especially recommended for building up cupped rails, welding car wheel flanges and work of any kind where it is necessary to secure a highly abrasive surface, combined with high tensile strength. Conforms to the American Welding Society's specification E-No. 1C.

Manganox for Electric Welding

Lengths, 18 and 36 inches.

Manganox rods not only contain a high percentage of carbox, but also have a high percentage of manganese. For this reason, they are exceptionally well adapted for welding railroad frogs, cross overs, switch points, etc.

Nickox for Acetylene or Electric Welding

Length, 36 inches.

A nickel alloy steel. It is especially recommended where it is necessary to secure a high tensile strength in the welded section. Used extensively for welding automobile, tractor and locomotive parts.

Steelkote No. 18 Coated Electrodes

Lengths, 14 and 16 inches.

Steelkote No. 18 coated electrodes are flux coated rods, intended for all-round steel welding by the electric process.

They are made especially for use with AC Electric Welding Machines where the coating is absolutely necessary for maximum results. This rod is also being adopted on a large scale by DC welders owing to the fact that the coating cuts down oxidation in the weld and improves the efficiency of the less experienced welder.

Steelkote No. 6 Anl'd Coated Electrodes

Length, 14 inches.

Steelkote No. 6 anl'd rods are pure iron with a special flux coating, and as the rods are annealed dead soft they flow freely at a low heat. They are made especially for welding cast iron by the electric process and are also satisfactory for welding boilers, tanks, flues, sheets, etc.

Mankote, Coated Electrodes

Length, 18 inches.

Mankote is a high manganese rod containing 12 to 14 per cent manganese. It is intended for building up high manganese frogs, switches, crossings, dipper teeth, etc., offering a glass hard surface with exceptional abrasive qualities but impervious to shock or strain.

Fluxes

A welder desiring to increase his efficiency cannot get good results without using a flux. For this reason the following have been manufactured: Castox Flux, Bronzox Flux and Aluminox Flux.

These products when used with the corresponding filler rod eliminate any possibility of impurities entering into the welded section and will tend to bring about the proper fusion.

Prices and special catalogue upon application.

Hard-Facing with Hascrome

Hascrome is widely used for reconditioning gyratory crusher mantles, other parts subjected to severe impact, giving the rebuilt parts a longer life than that of new parts at only a fraction of the cost.

Hascrome, a patented self-hardening chromium-manganese-iron alloy, is also used for building up badly worn parts preparatory to hard-facing with Haynes Stellite. Hascrome, at a low cost, furnishes strength and toughness in building a worn part back to original size before hard-facing. Hascrome is hard enough to resist a mushrooming effect under impact and because Haynes Stellite flows onto it with ease.

An excellent use for Hascrome is the repair of cracked or broken manganese steel parts and is applied by metallic arc welding after veeing out the cracks.

Oxy-Acetylene Process

Steel.—Clean the surface and preheat if necessary. If the surface cannot be cleaned a good flux will be helpful. When depositing Hascrome use a flame containing an excess of acetylene half-way between a neutral and a Haynes Stelliting (carbonizing) flame. Apply Hascrome when steel surface is just sweating—puddling is unnecessary.

Cast Iron.—Clean the surface and preheat if necessary. Then heat a small area at a time with the torch, breaking the surface crust with the end of the rod. A little puddling is usually necessary and a good flux is often helpful.

Metallic Arc Process

Reversed polarity must be used, making the rod the positive electrode. A current of 200 to 250 amperes is required for 1/4-inch diameter rod. The 3/16-inch diameter rod is recommended for arc welding and flows well at 150 to 175 amperes and 18 to 20 volts.

Sizes and Prices

Diameter...inches	1/4	3/16
Up to 50 Lbs...per pound	$.60	$.65
50 Lbs. and Over...per pound	.50	.55

Flux-coated rods, $.05 per pound extra.

Haynes Stellite Welding Rod

All grades of Haynes Stellite possess the quality of red hardness so essential in a wear-resisting alloy.

The grades of Haynes Stellite shown are the ones that usually give the best results on these particular jobs. The list may not apply in every case, due to variations in the size of the jobs and operating conditions in different plants, but it can be used as a guide for the first application of Haynes Stellite to a wearing part.

No. 1 (Black Label).—The hardest of the 3 grades and is more resistant to abrasion than Nos. 12 and 6. When properly backed up and supported no trouble will be experienced from extreme pressure or heavy shocks. This grade should be used for coating surfaces subjected to extreme abrasive wear and only little shock or impact.

No. 12 (Green Label).—Not quite as hard as No. 1 and is slightly less resistant to abrasion. It is, however, much stronger and somewhat more ductile. It will withstand more shock and impact than Grade No. 1.

No. 6 (Red Label).—Not quite as hard, but is considerably tougher and stronger than Nos. 12 and 1. While it is tougher than Nos. 12 and 1 its resistance to abrasive wear is slightly lower. It does not check or chip easily and is recommended for coating surfaces subjected to shock or impact and for hot shearing and blanking dies.

Diam. of Rod In.	Length of Rod In.	Per Pound	Weight Pounds per In.	Diam. of Rod In.	Length of Rod In.	Per Pound	Weight Pounds per In.
*1/8	3 to 7	$7.00	.0036	1/4	5 to 10	$4.00	.0175
**3/16	4 to 8	5.00	.010	5/16	6 to 12	3.75	.0245
.....	......	....	.....	3/8	8 to 14	3.75	.038

*Not available in Grade Nos. 12 and 6.

**Not available in Grade No. 12.

Coated rods for electric welding, $.05 per pound extra.

Weight of Haynes Stellite per Square Inch of Surface

Thickness...inches	1/16	3/16	1/8	1/4
Weight...pounds	.0194	.0582	.0388	.0776

Amsco Welding Rods

Nickel-Manganese Steel Welding Rods

This rod is efficient and economical for building up or repairing manganese steel castings, such as dipper teeth, lips, rock crusher parts, etc., or for giving an air-toughening, work-hardening manganese steel surface to rolled or cast carbon steel.

Furnished in standard lengths of 18 and 14 inches, straight and cut or in coils.

The 3/16, 1/4 and 5/32-inch wire comes in coils of about 200 pounds with inside diameters of 18 to 22-inches. The 5/16-inch wire comes in coils of about 200 pounds with the inside diameter about 28 inches.

Standard package, 50-pound box or burlapped bundle. Assorted diameters both bare and coated accepted to obtain quantity prices.

Per 100 Pounds—Straightened and Cut

Size	A Under 25 Pounds		B 25 to 75 Pounds		C 100 to 250 Pounds		D 275 to 500 Pounds		E 525 to 1000 Pounds		F 1025 to 1975 Pounds		G 2000 Pounds and Over	
In.	Bare	Coated	Bare	Coated	Bare	Coated	Bare	Coated	Bare	Coated	Bare	Coated	Bare	Coated
5/16	$38.00	$46.25	$35.50	$43.75	$33.00	$40.75	$30.50	$38.50	$29.00	$36.00	$28.50	$34.25	$27.00	$33.50
1/4	38.00	46.25	35.50	43.75	33.00	40.75	30.50	38.50	29.00	36.00	28.50	34.25	27.00	33.50
3/16	40.25	48.50	37.75	45.50	35.50	43.25	33.00	40.75	31.25	38.50	30.50	37.75	29.50	36.00
5/32	47.25	57.75	45.00	55.25	43.25	52.75	41.25	50.50	39.25	48.00	38.00	46.00	36.75	44.50
1/8	53.75	64.75	51.50	62.75	49.75	59.75	47.75	57.00	45.75	54.75	44.50	52.25	43.25	50.50

For lengths other than standard, add $1.00 per 100 pounds.

For wire in coils, deduct $1.00 per 100 pounds from the above prices for wire straightened and cut.

Hard-Surfacing Welding Rods

No. 459

This welding rod is an iron base cast rod containing substantial amounts of several alloying elements which give it, as a welded deposit, a resistance to abrasion at least equal to hard surfacing materials costing twice as much or more.

The Brinell hardness is between 500 and 600, and it has a degree of toughness that accounts not only for a wear resistance greater than that of merely hard materials, but also for a resistance to chipping and spalling that enables its use even where considerable impact is present.

This rod should not be used for repairing fractured parts or for building up to considerable depths, but only for hardfacing to thicknesses from 1/8 to 1/4-inch. Neither should it be employed where temperatures of over 500 degrees F. are maintained.

Size . . . . in.	3/16	1/4	5/16	3/8
Bare . . . . per lb.	$2.10	$1.65	$1.50	$1.30
Coated . . . . per lb.	2.20	1.80	1.65	1.45

No. 217

This more recently developed welding rod is also a cast rod, containing the same elements as No. 459, with additionally a high percentage of tungsten.

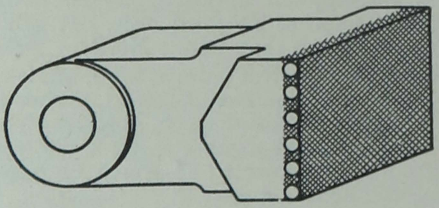
It gives a surfacing substantially harder (600 to 700 Brinell) and more wear resistant than No. 459, but one not quite so tough and resistant to shock, although equal in these respects to competitive materials. The No. 217 deposit will retain most of its wear hardness up to 1000 degrees F., and therefore, may be used where a No. 459 deposit would soften and wear out.

Applied in the same manner as No. 459 and is available in the same sizes, bare for oxy-acetylene welding, and with a coating for electrical application, which insures a stable arc, easy flowing, and a sound deposit.

Size . . . . in.	3/16	1/4	5/16
Bare . . . . per lb.	$4.50	$2.55	$2.40
Coated . . . . per lb.	4.60	2.65	2.50

Amsco Nickel Manganese Steel Filler Bars

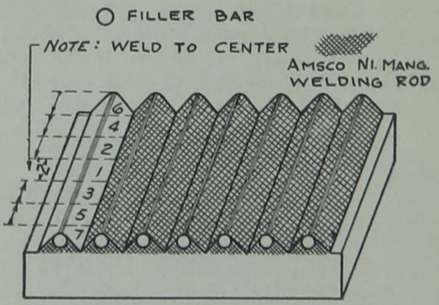
For Building-Up Welding



Pulverizer Hammer Rebuilt with Amsco Filler Bars and Welding Rod

For greatest economy manganese steel filler bars are recommended for use where the deposition of large amounts of metal is required, such as on crusher jaws, mantles and the like.

These round rolled bars are used as indicated in the above illustrations.



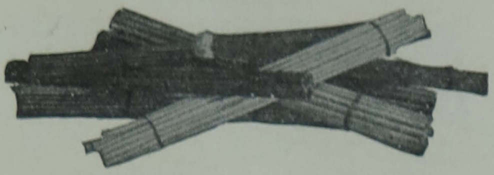
Jaw Plate Rebuilt with Filler Bars and Welding Rod

Furnished in 24-inch lengths and mill lengths (about 16 feet).

Diameter . . . . in.	1/2	3/4	1
Weight per Foot . . . . lbs.	.67	1.50	2.67
Per Pound	$.25	.23	.22

Extra for lengths other than 24-inch or mill lengths, 2 cents per pound.

Type D Raco Composite .13-.18 Electrodes



Type D Raco .13-.18 composite carbon white coated electrode is recommended for general purpose welding of mild steel, and is particularly adapted to boiler and tank manufacture.

On miscellaneous sheet metal work such as pans and boxes of lighter gage materials, and when ductility is a factor, Type D-.06 and .08 white coated electrodes are recommended.

A speed of 75 feet per hour is obtainable with white coated electrodes on lapwelds on 3/16-inch plates and smaller, welding in the down direction. An entire absence of leaks is the most remarkable characteristic of this electrode.

Free flowing with an almost entire absence of spatter. A tensile strength of approximately 60000 pounds per square inch is obtainable.

Type D white coated is a trifle fast for use on vertical and overhead welding; but can be used by experienced welders.

Furnished in Type D-.06 carbon, .15 manganese; Type D-.08 carbon, .30 manganese and Type D-.13-.18 carbon, .40-.60 manganese. These are described as low carbon rods. The Type D-.06 carbon carries an extra of 80 cents per 100 over base for analysis. The other two carbons are base prices. The base being 5/32 inch on both .08 carbon and .13-.18 carbon, 1/8-inch size always carries an extra for size over 5/32 inch of 25 cents per 100.

On the above grades, the impurities such as sulphur, phosphorous and silicon are all held down to a minimum, being .04 and under. This makes good welding wire—uniform quality.

Use regular or straight polarity on the welding machine. Recommended approximate amperage to use on the above grades in various sizes is as follows:

Size....................in.	3/32	3/16	1/8	1/4	5/32	5/16
Amps....................	90	160	130	190	140	240

For vertical and overhead welding, Type D red coated in any of the above carbons is supplied as the white coated is entirely too fast.

Raco Composite Type D white coated electrodes may be furnished for automatic welding in all mentioned carbon grades, in rewound 150-200-pound coils. Coils are securely wound on steel bands to insure the coils retain their shape during handling and shipment. The inside diameters of coils are 14 or 16 inches and the widths are 6 or 4 inches. The coils are wrapped with waterproof paper and burlap.

Raco Composite Type D white coated electrodes are also produced in the .30-.40 carbon, .40-.60 manganese grade, as in the mild steel electrodes impurities are under .04. These electrodes may be used both for manual and automatic welding and are used chiefly for building up wearing surfaces on shafts, etc.

Raco Type D .30-.40 carbon electrodes produce a dense weld metal more resistant to wear than mild steel. The weld metal is free from slag inclusions and porosity.

Currents recommended approximately the same as the mild steel grades.

Type H-D Raco Shielded Arc Electrodes

Designed for high speed welding with direct current, sizes up to and including 3/16-inch are for all position welding. Electrodes in the 1/4-inch size and larger are for flat welding only.

For butt welding, use higher current values resulting in greater speed of welding. On lap and fillet welds, use medium current values and short arc with the electrodes at 45° to the horizontal member.

For vertical welding, electrodes should be held pointing slightly upward. Weaving, in the form of a U is desirable. This will prevent the molten metal from running back, under-cutting and will result in a smooth weld without excessive convexity.

For overhead welding, electrodes should be held vertically. As short an arc as possible should be used. Deposit small beads. Scale each bead thoroughly.

Type H-D Raco Shielded Arc Electrodes

Continued

Recommended Currents for Flat Welding

Size Electrode In.	Amperes Nos. 7 and 8	Amperes No. 9	Size Electrode In.	Amperes Nos. 7 and 8	Amperes No. 9
3/32	60-100	60- 90	7/32	160-240	....
1/8	100-120	90-110	1/4	180-280	....
5/32	120-160	110-150	5/16	280-400	....
3/16	140-180	130-170	3/8	350-500	....

Recommended Currents for Vertical and Overhead Welding

Size Electrode In.	Amperes Nos. 7 and 8	Amperes No. 9	Size Electrode In.	Amperes Nos. 7 and 8	Amperes No. 9
3/32	60- 90	60- 90	5/32	110-140	100-140
1/8	90-120	80-100	3/16	120-160	130-160

Analysis of Electrodes and Weld Metal

	Electrodes Nos. 7, 8 and 9	Weld Metal Nos. 7 and 9	Weld Metal No. 8
Carbon..........per cent	.08-.10	.08-.10	.10-.12
Manganese......per cent	.40-.60	.20-.50	.20-.50
Sulphur.........per cent	Under .04	Under .04	Under .04
Phosphorus......per cent	Under .04	Under .04	Under .04
Silicon..........per cent	Under .04	Under .04	Under .04

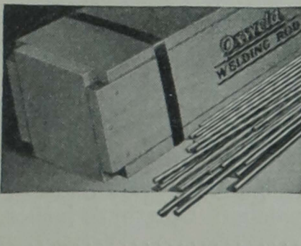
Physical Properties of Weld Metal

Welds are machineable, can be bent cold or forged.

	Nos. 7 and 9	No. 8
Yield Point, per Sq. In......lbs.	50000-62000	50000-62000
Ult. Strength per Sq. In.....lbs.	60000-70000	65000-75000
Elongation in 2 In......per cent	20 to 30	18 to 25
Elongation Free Bend, Min. in Outer Fibre..........per cent	30	25
Impact (Izod)...........ft. lbs.	50 to 80	....
Specific Gravity...............	*7.80-7.85	7.80-7.85
Corrosion Resistance...........	Better than Mild Steel	

*No. 9 only.

Oxweld Welding and Cutting Supplies



Oxweld Rods and Fluxes are of recognized high quality. No effort or expense is spared to develop the proper analysis of each. Each rod is made for a specific use and its quality and uniformity are constantly checked by chemical, physical, metallurgical, and field tests. Years of experience show that Oxweld Rods produce superior results.

No. 1 H.T. (High Test) Patented Steel Rods

For high strength welds in steel plates, sheets, structural shapes, pipe, steel castings, etc. Length, 36 inches.

Diameter......inches	1/16	1/8	3/16	1/4	5/16	3/8
No. 1.......per pound	$.23	.21	.20	.20	.20	.20

No. 2 High Carbon Steel Rods

For high carbon steel. Length, 36 inches.

Diameter.................................inches	3/16	1/4
No. 2..............................per pound	$.20	.20

No. 3 Nickel Steel Rods

For cold rolled shafting, nickel or chrome steel. Length, 36 inches.

Diameter.........................inches	1/8	3/16	1/4
No. 3..........................per pound	$.18	.17	.16

No. 4 Manganese Steel Rods

For manganese steel, ends painted green. Length 36 ins.

No. 4, Diameter 1/4 Inch..................per pound **$.40**

Oxweld Welding and Cutting Supplies

Continued

No. 7 Drawn Iron Rods

For steel plates, sheets, structural shapes, pipe, etc. Copper coated. Length, 36 inches.

Diameter............inches	1/16	3/32	1/8	3/16	1/4
No. 7.............per pound	$.16	.16	.16	.15	.15

No. 9 Cast Iron Rods

For gray iron castings.

Diameter...............inches	3/16	1/4	5/16	3/8
Length.................inches	12-18	21-24	21-24	21-24
No. 9................per pound	$.14	.12	.11	.10

No. 25M Patented Bronze Rods

For high strength, wear resisting welds in copper, brass, and for bronze welding malleable iron, steel and cast iron. Length, 36 inches.

Diameter....inches	1/16	3/32	1/8	3/16	1/4	3/8
No. 25M .....per 100 lbs.	$56.00	49.00	44.75	39.25	36.375	34.125

No. 21 H. S. (High Strength) Patented Bronze Rods

For high strength welds. Length, 36 inches.

Diameter......inches	1/16	3/32	1/8	3/16	1/4
No. 21....per 100 lbs.	$56.00	48.50	44.75	39.25	36.375

No. 10 Bronze Rods

For cast iron, bronze, etc. Length, 36 inches.

Diameter......inches	1/16	3/32	1/8	3/16	1/4
No. 10....per 100 lbs.	$52.75	45.25	41.50	36.25	33.625

No. 11 Drawn Manganese Bronze Rods

For cast iron, brass, bronze, etc. Length, 36 inches.

Diameter....................inches	1/8	3/16	1/4
No. 11..................per 100 lbs.	$43.25	38.00	35.375

Tobin Bronze Rods

For cast iron, bronze, brass, etc. Length, 36 inches.

Diameter....................inches	1/8	3/16	1/4
Per 100 Pounds....................	$42.50	37.25	34.625

No. 19 Cupro Rods

For rail bonding and metal furniture manufacture. Length, 36 inches.

Diameter............................inches	1/8	3/16
No. 19..........................per 100 lbs.	$46.75	41.50

No. 23 Aluminum Rods

For cast and sheet aluminum, and aluminum alloys. Length, 36 inches.

Diameter.........................inches	1/16	1/8	1/4
No. 23.....................per pound	$.70	.63	.62
No. 23, In 10-Pound Coils.....per pound	$.66	.59	...

No. 14 Drawn Aluminum Rods

For sheet aluminum. Length, 36 inches.

Diameter...............................inches	1/8	1/4
No. 14.............................per pound	$.54	.54
No. 14, In 10-Pound Coils...........per pound	$.51	...

No. 15 Lynite Aluminum Rods

For aluminum castings. Length, 36 inches.

Diameter...............................inches	3/16	1/4
No. 15.............................per pound	$.87	.77

Carbon Rods

Size..........inches	3/8x12	1/2x12	5/8x12	3/4x12	7/8x12	1x12
Each................	$.08	.10	.15	.19	.25	.32

Carbon Plates

Size.......inches	1/2x6x12	1x6x12	3/4x5x18	1x6x18	1x6x30
Each...........	$.83	1.21	1.18	1.82	2.75

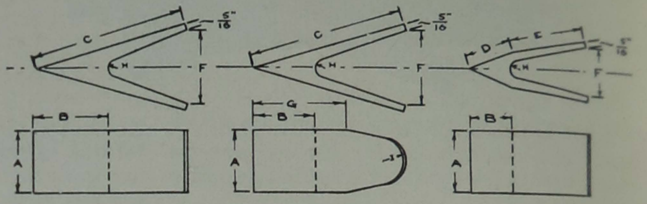
Carbon Paste

Carbon Paste, in 5-Pound Pails only.......per pound $.25

We are in position to supply many items not shown in this catalogue and shall be pleased to receive your inquiries.

Amsco Manganese Steel Dipper Tooth Repointers

Cast-to-Shape



Style S Style R Style U

Pattern No.	Style	Dimensions, Inches A	B	C	D	E
192209	U	2 1/2	2 1/2	...	3	2 1/8
192791	R	2 1/2	2 3/8	5 1/4	..	...
192162	S	2 3/4	2 1/2	4 1/2	..	...
192034	R	3	3 1/2	7 1/2	..	...
192767	R	3	3	6	..	...
192785	R	3	3	7	..	...
192546	S	3	3 7/8	9	..	...
191392	S	3	3 1/2	6	..	...
192208	S	3 1/4	2 3/8	5 1/4	..	...
191712	R	3 1/2	3 1/2	7 1/4	..	...
124216	S	3 1/2	3 1/2	6	..	...
191958	S	3 1/2	3 1/2	8 1/4	..	...
192033	R	3 3/4	3 1/2	7 1/2	..	...
191829	S	3 3/4	3 1/2	6	..	...
192813	R	4	3 3/8	7 3/8	..	...
192398	S	4	3 1/2	6	..	...
192962	R	4 1/4	3 5/8	6 5/8	..	...
191239	S	4 1/2	3 1/2	6	..	...
192527	S	4 1/2	3 1/2	8 1/4	..	...
192828	S	5	3 1/2	8	..	...
191426	S	5 1/4	3 1/2	8 1/4	..	...
191354	S	5 1/4	3 1/2	6	..	...

Pattern No.	Style	Dimensions, Inches F	G	H	I	Approx. Weight Pounds
192209	U	2 1/8	...	5/8	...	4
192791	R	2 5/8	3	1/2	3/4	3
192162	S	2	...	5/8	...	3
192034	R	3 1/4	4 1/4	5/8	1	6
192767	R	2 1/2	4	1/2	1	4 1/2
192785	R	2 3/8	4 3/4	1/2	1	5
192546	S	3 3/8	...	5/8	...	9
191392	S	2 1/2	...	5/8	...	5
192208	S	2 11/16	...	5/8	...	5
191712	R	3 1/4	4 1/4	5/8	1	6
124216	S	2 1/2	...	5/8	...	6
191958	S	3 5/8	...	5/8	...	7
192033	R	3 3/8	4 1/4	5/8	1	7
191829	S	2 1/2	...	5/8	...	6
192813	R	3 3/8	4 1/2	5/8	1	6 1/2
192398	S	2 1/2	...	5/8	...	7
192962	R	3 1/2	4	5/8	1	8
191239	S	2 1/2	...	5/8	...	8
192527	S	3 5/8	...	5/8	...	9 1/2
192828	S	3 3/4	...	7/8	...	12
191426	S	3 5/8	...	5/8	...	11
191354	S	2 1/2	...	5/8	...	9

Per Pound

1 to 9 Pieces, From Any One Pattern............	$.225
10 to 49 Pieces, From Any One Pattern............	.20
50 Pieces and Over, From Any One Pattern.......	.19

Manganese steel cast bars for making dipper teeth pointers, can be furnished in 36-inch lengths.

XXXX Nickel Babbitt Metal

XXXX NICKEL
FEDERATED METALS CORPORATION
The World's Best Babbitt Metal

Armatures, automobiles, steamship, diesel, reciprocating engines, heavy duty mine motors, concentrators, Griffin mills, sugar centrifugals, crank pins, crushers and many other journals operated under extraordinary speed and pressure require a high class alloy. The alloy must be hard and tough if durability of liner is essential.

XXXX Nickel Babbitt Metal is a durable bearing alloy, carefully made with a view to having it stand up under the hardest service.

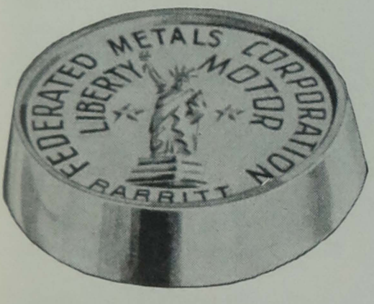
It is recognized, used and sold throughout the industrial world by those desiring the highest grade of babbitt metal.

The use of XXXX Nickel Babbitt Metal is recommended to those who have failed to get satisfactory service from the ordinary grades of metal.

Put up in boxes of 28, 56 and 112 pounds.

Prices upon application.

Liberty Motor Babbitt Metal

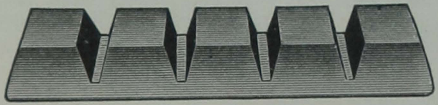


For heavy duty, high-speed machinery bearings. It will withstand a pressure of 24000 pounds per square inch, without showing scale or fracture.

Can be successfully used for any purpose where a genuine babbitt is necessary with the exception where the bearing liner is ¼ inch thick or less, such as automobile connecting rods and armatures.

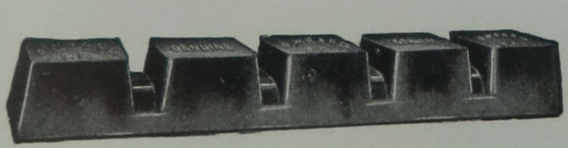
Per Pound.. ......

Diesel Engine Babbitts



A high grade babbitt developed for heavy loads. Unexcelled for Diesel engines, Marcy mills, etc.
Stocked in 25, 50 and 100 pound boxes.
Prices upon application.

Federated Genuine Babbitt



The time honored genuine formula used for heavy duty bearings.

Pouring temperature, 810° Fahrenheit.

Weight per cubic inch, .267 pound.

Prices upon application.

Merit Babbitt Metal

FEDERATED MERIT METAL METALS CORPORATION
FEDERATED MERIT METAL METALS CORPORATION

This babbitt is recommended for general all around use. It is composed of the finest anti-frictional metals in exact proportions to give the maximum of service.

Merit Metal is so dense, hard and tough, that it does not crush or pack under heavy loads. It is of even texture. It is easy to use, it flows like oil, assuring sound castings and dependable anchorage.

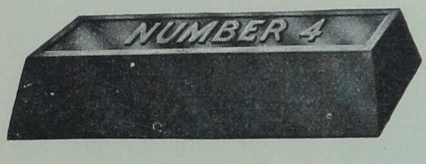
Price....................................per pound ......

Boveall Babbitt Metal

FEDERATED METALS CORPORATION
BOVEALL
BABBITT

A compact, free-flowing alloy with fine grain. It is durable and cool-running; low co-efficient of friction. Load carrying strength more than 20,000 lbs. per square inch.

No. 4 Babbitt Metal



A low grade of metal but satisfactory in many cases. Composed principally of lead, with a sufficient percentage of antimony to harden it.

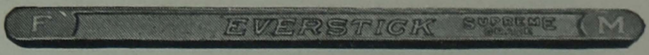
Price, No. 4, Weight per Bar, 8¾ Lbs......per pound $.25

Directions for Pouring Federated Bearing Metals

1. Clean the melting pot and casting ladles of all residues remaining from the previous casting. Use a good sized melting pot and a ladle sufficiently large to hold all the metal necessary to pour the entire bearing at one time. It is better to melt a little more than not enough.
2. Pour as soon as the metal reaches proper temperature. Avoid delay in pouring by having all preparations completed and ready before starting the melt. If possible, melt babbitt near the spot at which the bearing will be poured, to prevent carrying the molten metal long distances.
3. Stir thoroughly and skim well immediately before pouring.
4. Pre-heat the box and mandrel to the point where metal stops sweating (between 300° and 450° Fahrenheit). Caution: Overheating is just as harmful as underheating. Watch the temperature.
5. If backing is to be tinned, refer to instructions for tinning.
6. Place removable bearings in a vertical position for casting, and provide a waste head in order to avoid air bubbles and produce a thoroughly sound casting.
7. Pour slowly at first to expel the air from the bottom; then pour more quickly in a steady stream, holding ladle close to the work.
8. It is highly important to make the bearings denser and more durable by quickly cooling the newly poured bearings. This may be accomplished in one of the following ways:
   (a) Apply cold water to the box by means of a sprinkler or hose and cool from the bottom to the top, not from the top downward. (b) Or place the bearing-shell in a vessel sufficiently large to contain it, and still leave a space to be filled with water. Then, after pouring, fill the vessel with cold water, thus cooling the bearing quickly from the bottom upwards.

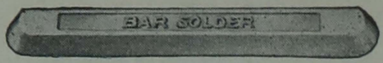
Good alignment is essential in bearings where continued wear, service and durability are important. If the mandrel is smoked or thoroughly rubbed with chalk before the bearing is poured it will facilitate removal of the mandrel.

Everstick Supreme Bar Solder


F
EVERSTICK
SUPREME
M

This is an outstanding development in soft solder. It replaces the old style Warranted 50-50 solder—a fine solder for people requiring something better.

Bar Solder



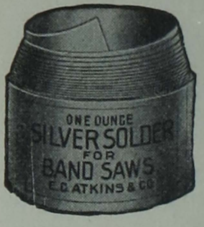
Furnished in bars weighing approximately 1 pound.

Strictly 45-55.

Warranted 50-50.

Per pound.................................... ....

Atkins Silver Solder


ONE OUNCE
SILVER SOLDER
FOR
BAND SAWS
E.C. ATKINS & CO.

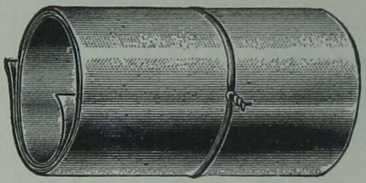
Made in accordance with an exclusive formula, perfectly adapted for the purpose; in all widths and gauges used for brazing band saws.

Stock sizes are ½, ⅝, ¾ and 1 inch in width by .003 and .004.

Packed in 1-ounce metal boxes.

Price upon application.

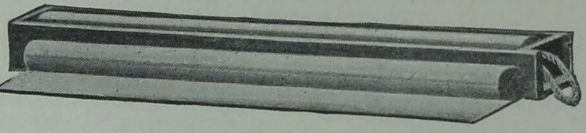
Roll and Sheet Brass



We are prepared to furnish roll and sheet brass in any size sheet desired.

Prices upon application

Sheet Lead

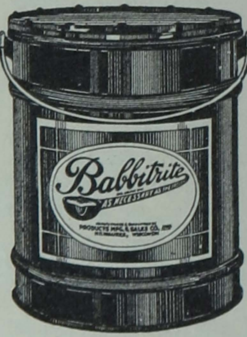


Thickness.....in.	1/64	1/32	3/64	1/25	1/16	1/14	1/12	1/8
Wt. Sq. Ft...lbs.	1½	2	2½	3	4	5	6	8

Market prices.

Babbitrite

A Retainer for Molten Babbitt Metal


Babbitrite

Babbitrite is supplanting putty and clay as a retainer for molten babbitt metal, while pouring bearings. When it is used, blow-outs are impossible and perfect bearings are assured.

It can be used 100 times for babbitting without requiring any preparing or mixing. It will not dry out, harden or absorb moisture, being unaffected by heat. It combines strength of body with the quality of adhering closely to the work.

No. **5** Size Can	per can	$1.75
No. **15** Size Pail	per pail	4.25
No. **30** Size Pail	per pail	7.50
No. **50** Size Pail	per pail	12 50

Neatpak Acid Core Wire Solder

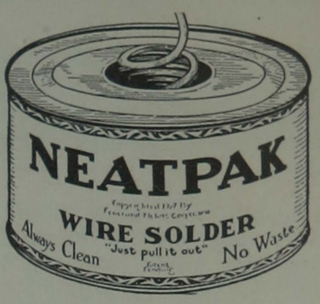
NEATPAK
WIRE SOLDER
"Just pull it out"

For general repair shops, garages and outdoor electrical work; used by plumbers.

Standard gauge, ⅛ inch.

Prices upon application.

Federated Neatpak Wire Solder

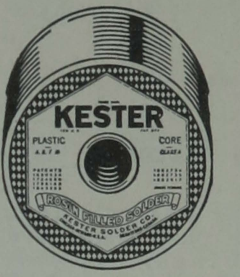

NEATPAK
WIRE SOLDER
Always Clean
"Just pull it out"
No Waste

Neatpaking means enclosing the solder in an airtight can. Can has an opening in its cover which is covered by a sheet of cellophane, thereby sealing the package from air and moisture. Furnished in all standard formulas.

Furnished only in ⅛ inch diameter.

Kester Plastic Rosin-Filled Solder

For Electrical and Radio Work


KESTER
PLASTIC
CORE
ROSIN FILLED SOLDER
KESTER SOLDER CO.

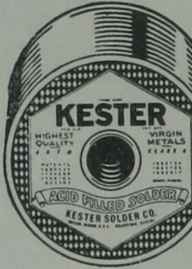
Contains a plastic rosin flux that will not corrode. For this reason it is recommended for electrical and radio work.

Standard size No. 5 Kester Plastic Rosin-Filled Solder is approximately 3/32 inch in diameter, running about 50 feet to the pound. May be furnished in sizes from approximately ¼-inch diameter to about .040 inch diameter. Can also be furnished in ribbon or flat type.

Size Spool.....pounds	1	5	20
Each	.....	.....	.....

Kester Acid-Filled Solder

For General Soldering


KESTER
HIGHEST QUALITY
VIRGIN METALS
ACID FILLED SOLDER
KESTER SOLDER CO.

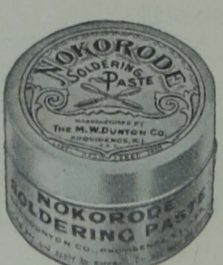
Used on both new and old work. Also recommended for heavy outside electrical wiring.

Standard size No. 3 about ⅛ inch in diameter. About 30 feet per pound.

As the heat is applied a scientific flux flows from tiny pockets inside hollow wire form of Kester; melting, it forms a permanent bond. Requires only heat.

1-Pound Carton	each	.....
1-Pound Spool	each	.....
5-Pound Spool	each	.....
20-Pound Spool	each	.....

Nokorode Soldering Paste


NOKORODE
SOLDERING PASTE
THE M. W. DUNTON CO.
PROVIDENCE, R.I.

This paste will flux all metals except aluminum. It takes the place of acid in all soldering jobs. Non-corrosive, safe as resin and rapid as acid. Not affected by heat and does not spatter. The solder will not turn dark after using this paste.

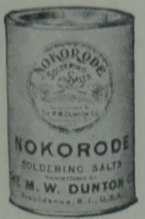
In Cartons

Size Can	2-Oz.	1-Lb.
Per Can	$.15	$.90
Per Carton	1.20	4.50
No. Cans in Carton	12	6

By Pound

Size Can.....pounds	10	25	50	500
Per Pound	$.50	.45	.43	.40

Nokorode Soldering Salts



Nokorode Soldering Salts eliminates the use of corrosive soldering acid and is the remedy for all soldering troubles. It makes lasting and non-corrosive joints.

It is extensively used by plumbers, tinsmiths and leading manufacturers in all lines. It is economical and has no disagreeable fumes while under heat. Will not burn the operator's hands or clothing. It is recommended to dissolve 1 pound of salts in 1 gallon of water.

Size Can	Standard Package	Per Lb.	Per Carton
1 Lb.	6 to Carton	$.60	$3.00
5 Lbs.	Any Quantity	.45	....
25 Lbs.	Any Quantity	.35	....
50 Lbs.	Any Quantity	.32	....
500 Lbs.	In Barrel	.20	....

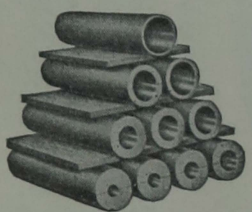
Allen Soldering Salts

ALLEN
SOLDERING SALTS

These salts are dry and in concentrated form. To make up a perfect flux of sufficient strength to use on old metal add 3 parts water to 1 part salts; on new metal, use even greater dilution.

½-Pound Bottles.................... each	$.40
1-Pound Bottles.................... each	.59
5-Pound Bottles.................... each	2.70

Cast Iron Cored Bushings



Made of a fine grade of gray iron in 12-inch lengths.

O.D. In.	I.D. In.	O.D. In.	I.D. In.	O.D. In.	I.D. In.	O.D. In.	I.D. In.	O.D. In.	I.D. In.
1	½	1⅜	⅞	2	1	2½	1¾	3½	1¾
1⅛	½	1½	⅝	2	1¼	2¾	1½	3½	2
1⅛	⅝	1½	¾	2¼	1	2¾	1¾	2½	2½
1¼	½	1½	1	2¼	1¼	3	1¾	4	2¼
1¼	⅝	1¾	¾	2¼	1½	3	2	4	2½
1¼	¾	1¾	1	2½	1⅛	3¼	1¾	4	3
1⅜	⅝	1¾	1¼	2½	1¼	3¼	2	...	...
1⅜	¾	2	¾	2½	1½	3¼	2¼	...	...

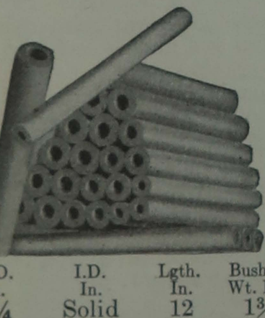
Prices upon application.

Cast Iron Solid Bushings

These bushings are made in 12-inch lengths and in the following diameters; ¾, 1, 1¼, 1½, 1¾, 2, 2¼, 2½, 2¾, 3, 3¼, 3½, 3¾, 4, 4½, 5, 5½ and 6.

Prices upon application.

Rough Bronze Bushing Castings



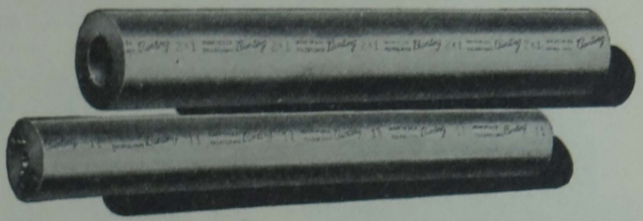
The co-efficient of friction is comparatively low.

Casting uniform throughout; can be easily machined.

Other sizes made to order on short notice.

O.D. In.	I.D. In.	Lgth. In.	Bushing Wt. Lbs.	O.D. In.	I.D. In.	Lgth. In.	Bushing Wt. Lbs.
¾	Solid	12	1¾	1¾	⅝	12	5¾
1	½	12	2¼	1¾	1	12	6¼
1⅛	1	12	3	1⅞	1¼	12	5¾
1¼	⅝	12	3¼	2	1⅛	12	8¼
1⅜	⅝	12	3½	2¼	1⅜	12	10
1½	¾	12	5	2⅜	1	12	12
1⅝	⅞	12	5½	2½	1⅝	12	11
Per Pound..............................							....

Bunting Machined and Centered Bronze Bars



Outside diameter is concentric with inside diameter, entirely eliminating the usual centering of the bar by the user and resultant expense. All bars are 13 inches long instead of the usual 12 inches. All hard scale is removed. There are no under-surface defects. Ends of bars are machined. Cored bars are rough cast on inside to size stamped on bar. Allow ⅛-inch finishing stock on this dimension.

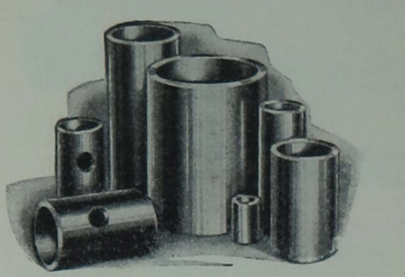
Cored Bars

Piece No.	O.D. Inches	I.D. Inches	Approx. Wt., Lbs.	Piece No.	O.D. Inches	I.D. Inches	Approx. Wt., Lbs.
A	1	½	2¾	IX	3	1	25½
AX	1	⅝	2¼	IA	3	1¼	24½
B	1¼	½	4¾	IW	3	1½	22
BW	1¼	⅝	4¼	IB	3	1¾	19½
BX	1¼	¾	3¾	I	3	2	16
BA	1⅜	½	5¾	IC	3	2¼	13
BY	1⅜	⅝	5¼	IE	3¼	1¼	29¼
BC	1⅜	⅞	3¾	IF	3¼	1½	26½
CX	1½	½	6¼	IG	3¼	1¾	24
C	1½	¾	5¼	IH	3¼	2	21
CA	1½	1	4½	J	3¼	2¼	17½
CB	1⅝	⅝	7¾	JB	3½	1	35½
CD	1⅝	⅞	6½	JC	3½	1½	31½
CE	1⅝	1⅛	4¾	JD	3½	1¾	29
D	1¾	¾	8¼	JE	3½	2	26¾
DA	1¾	1	7¼	JA	3½	2¼	22¾
DX	1¾	1¼	5¼	K	3½	2½	20
DH	1⅞	⅞	9½	KG	3¾	1½	37¼
DC	1⅞	1⅛	7¾	KE	3¾	1¾	35½
DG	1⅞	1⅜	5¾	KA	3¾	2	32½
DF	2	½	12½	KF	3¾	2¼	29½
DB	2	¾	11¼	KB	3¾	2½	26
E	2	1	10¼	KX	3¾	2¾	21½
EA	2	1¼	8¼	KC	4	1	48
EB	2	1½	6	KH	4	1½	42½
EW	2⅛	⅝	13½	KD	4	2	38½
EY	2⅛	⅞	12½	LA	4	2½	32
EF	2⅛	1⅛	11	L	4	3	24
EG	2⅛	1⅜	9	LB	4¼	1¾	49
EH	2⅛	1⅝	6¼	LE	4¼	2	44½
EZ	2¼	¾	15¼	LC	4¼	2½	37½
EX	2¼	1	13¾	LD	4¼	3	29
F	2¼	1¼	11½	M	4¼	3¼	24½
FA	2¼	1½	9½	MC	4½	1½	57
FC	2⅜	1⅝	10	MCX	4½	2	53¼
FG	2⅜	1⅞	7½	MD	4½	2½	46
GD	2½	¾	19	MI	4½	3	35½
GX	2½	1	17¼	MG	4½	3½	26½
GY	2½	1¼	15¾	MF	4¾	2¾	48½
G	2½	1½	13¼	MK	4¾	3¼	38
GA	2½	1¾	10½	MH	5	2	67
GH	2⅝	1⅜	16½	ML	5	2½	59½
GF	2¾	¾	23¼	MA	5	3	51
GE	2¾	1	21	MAX	5	3½	44½
GB	2¾	1¼	19¾	ME	5½	2½	75½
GC	2¾	1½	17¼	MO	5½	3¼	62¼
H	2¾	1¾	15	MOX	5½	3½	59¼
HA	2¾	2	12¼	MB	6	3	86
HC	2⅞	1⅝	19	MX	6	4	63¼
HB	2⅞	2⅛	12¾	......	...	...	....

Solid Bars

Outside Diameter Inches	Approx. Weight Pounds	Outside Diameter Inches	Approx. Weight Pounds	Outside Diameter Inches	Approx. Weight Pounds	Outside Diameter Inches	Approx. Weight Pounds
½	1	1½	7¾	2½	20¾	3¾	45
⅝	1½	1⅝	9	2⅝	22½	4	51
¾	2	1¾	10¼	2¾	25	4¼	57
⅞	2¾	1⅞	11½	2⅞	26¾	4½	63
1	3½	2	13¼	3	30	5	78
1⅛	4½	2⅛	15	3⅛	31	5½	96
1¼	5½	2¼	16¾	3¼	33½	6	118
1⅜	6½	2⅜	19	3½	39½	...	...

Bunting Bronze Standardized Bearings



There are over 600 different sizes of completely machined and finished Bunting Bronze Bushings and Bearings available from stock at all times, ready for assembly in all machinery and electrical equipment units.

The range of sizes covers every usual need.

These bearings can be furnished for all different types of motors.

Prices and Further Information upon Request

Rowell Melting Ladles

Has bottom pour and self-skimming features. Impossible for accumulation to enter part poured.

Diam....in.	3	4	5	6	7	8	*9	*10
Ladle....ea.	**$2.10**	**$2.40**	**$2.70**	**$3.60**	**$3.90**	**$4.20**	**$5.10**	**$6.00**
Bowl....ea.	....	**1.38**	**1.68**	**2.34**	**2.64**	**2.94**	**3.78**	**4.68**
Handle..ea.	....	**.66**	**.66**	**.90**	**.90**	**.90**	**.96**	**.96**
Depth...in.	2¼	2	2½	3	3½	4	5	5¼
Cap. Lead...lbs.	4	4½	9	18	25	40	60	90
Cap. Water..pts.	⅜	½	1	2	3	4	7	9

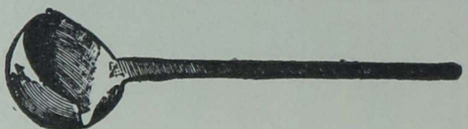
All Handle Slides..............................each **$.30**

*Can be furnished with 2 handles, extra cost, $1.30.

Melting Ladles

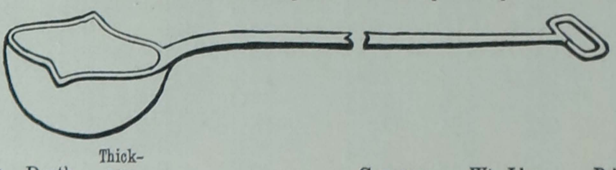
Seamless Sheet Steel Bowl, Welded Handle

Handle with Hole Punched in End



Diam. Bowl In.	Depth Bowl In.	Thickness Material In.	Handle, In. Lgth.	Handle, In. Size	Capacity Liquid Pt.	Capacity Lead Lbs.	Wt., Lbs. per Doz.	Price per Doz.
2½	1 3/16	9/64	10	3/16x½	⅛	1	7	**$6.00**
3	1½	9/64	11½	3/16x½	¼	1½	10	**7.20**
3½	1¾	9/64	12	3/16x⅝	⅜	2½	13	**8.40**
4	2	9/64	14	3/16x⅝	½	4	17	**9.60**
5	2½	9/64	19	¼x¾	¾	8	31	**12.00**
6	3¼	9/64	21	¼x⅞	1	13	41½	**14.40**

Handle with Open or Loop Grip



Diam. Bowl In.	Depth Bowl In.	Thickness Material In.	Handle, In. Lgth.	Handle, In. Size	Capacity Liquid Qt.	Capacity Lead Lbs.	Wt., Lbs. per Doz.	Price per Doz.
6	3¼	3/16	21	5/16x1	½	13	72	**$24.00**
7	3½	3/16	24	5/16x1	1	23	90	**48.00**
8	4	¼	26	5/16x1⅛	1½	34	126	**72.00**
9	4¼	¼	30	5/16x1⅛	2	47	162	**96.00**
10	4¾	¼	36	5/16x1¼	3½	68	192	**120.00**
12	6	¼	40	⅜x1¼	5	112	276	**144.00**

Bowls Only

No handles. With or without lips. Prices upon application.

Melting Pots with Lip

Cast bowl. Wrought iron handle.

Diam. Inches	Depth Inches	Capacity Pounds	Weight Pounds	Price Each
12	7½	175	24	**$4.20**
13½	8	200	28	**5.40**
15	10	300	60	**9.00**

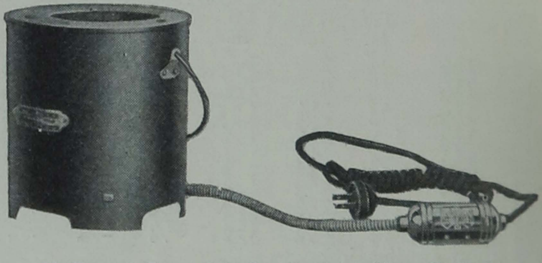
No. 1 Melting Pots

Without Lip

Cast bowl and wrought iron handle.

Diam. In.	Each	Depth In.	Cap. Lbs.	Weight Lbs.
4	**$.40**	2¼	8	2
5	**.50**	2¾	10	2½
6 Spl.	**.60**	3	15	3
6	**.70**	3½	20	4
7	**1.00**	3¾	25	5
8	**1.40**	4¼	35	6
9	**2.00**	5¼	60	10
10	**2.80**	5¾	90	15

Westinghouse Electric Solder Pots



10-Pound Pot with Cord and 3-Heat Switch

Westinghouse Portable Electric Melting Pots have a wide range of uses in manufacturing processes requiring small quantities of soft metals or alloys, such as solder, babbitt, white or type metal. In addition, they can be used for melting paraffin, wax and rosin compounds.

Pots have sheet steel casings and cast iron vessels. The sides and bottom are encased in insulating material. Heating elements are coils of nickel chromium wire threaded into ceramic insulators. They fit around and in close contact to the crucibles.

Made with 10 and 50 pounds capacity and a content of 30 and 167 cubic inches respectively. Provided with 3-heat snap switch, latter size arranged for separate mounting. The 10-pound pot will completely melt 10 pounds of solder in 35 minutes with the current maximum and the 50-pound pot will melt 50 pounds of solder in 75 minutes. The maximum temperature at which the pots will operate is 950° F. Lower temperatures for keeping the charge in working condition can be obtained by means of the 3-heat switch.

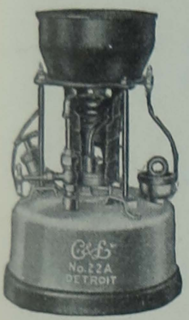
Cat. No.	Each	Watts Max.	Volts	Capacity Lbs.	Capacity Qts.	Dimensions, In. Overall Wdth.	Dimensions, In. Overall Ht.	Dimensions, In. Solder Vessel Diam.	Dimensions, In. Solder Vessel Dpth.	Ship. Wt. Lbs.
299708	**$14.00**	500	110	10	0.6	7¼	7	3	3¾	11
710503	**55.00**	1800	110	50	3.0	18¾	15	6	6½	125
710502	**55.00**	1800	220	50	3.0	18¾	15	6	6½	125

When ordering, specify capacity, voltage and Cat. No.

No. 22A C & L Coil Fire Pots

1-Gallon Capacity

For Gasoline



The drawn steel tank is leakproof and heavily coated with tin inside and out. This prevents rust that works up into the coil and burner. Improved quick detachable coil unit and hinged door coil cup make it easy to clean and repair.

Pump is extra large and powerful, producing air pressure quickly.

Uprights and fittings are extra heavy.

Shipping weight, 13¾ pounds.

No. 22A....................................each **$25.00**

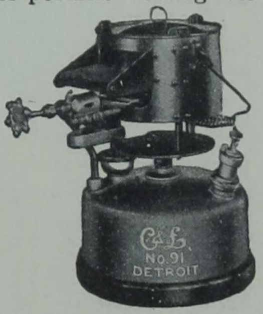
No. 91 C & L Single Needle Fire Pots

For Gasoline

The burner has great generating power and burns either high or low test gasoline. A swivel permits turning the burner up or down. The top section is of steel and can be quickly removed by loosening a set screw, and base with burner used as an open fire.

The heavy gauge drawn steel tank is tinned inside and out, which prevents rust. It is strongly reinforced and fitted at base with patented cushion band. Heats a pair of 12-pound soldering coppers and pot of lead at same time.

No........................	91
Shipping Weight....pounds	14¾
Price.................each	**$33.00**

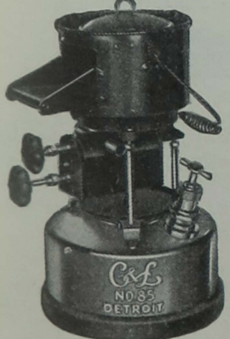


Capacity 1 Gallon

No. 85 C & L Firepots

Quick Generating, 1-Gallon Capacity

For Gasoline



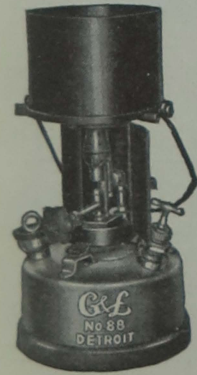
Designed for tinners, roofers, sheet metal workers, tool makers and garage mechanics. The blue flame patented preheater directs an intense preheating blast (1800°) against the vaporizing veins of the back burner which simplifies and speeds up process of generating.

Can be quickly regulated from full volume to small, low fire for light work. Can be operated at full capacity for 6 hours on a single gallon of fuel.

No. 85....................................each	**$35.55**
Shipping Weight..............................pounds	18¾

No. 88 C & L Multi-Flame Fire Pots

For Gasoline or Kerosene



Recommended for the use of mechanics who need an extra powerful and fully controlled heat for either indoor or outdoor work. The large volume of intensely hot fire can be reduced to a small lazy flame by turning the burner valve. A large pot of lead or solder can be quickly melted and kept at a low heat to prevent burning the metal. Large top plate is fitted with 8-inch shield to take large metal pot. Height 18 in. or without shield 14 in. Diameter tank 9¾ in. Regularly furnished for gasoline; specify if desired for kerosene.

Capacity	1 Gal.
No. 88 ....each	**$38.10**
Shipping Weight ....pounds	19½

C & L Blow Torches

No. 32A, 1-Quart Capacity
No. 238, 1-Pint Capacity

For Gasoline

C&L
No.32A
DETROIT

Performs perfectly either indoors or outdoors under severe weather conditions. Powerful burner of improved construction is fitted with wind shield and has self-cleaning non-enlargeable gas orifice.

The quart size burner produces an intensely hot blue blast 7 inches long which may be regulated for lighter work. Pint size burner is smaller.

No...............	32A	238
Each.............	**$18.00**	**17.00**
Capacity.........	1 Qt.	1 Pt
Ship. Wt.......lbs.	5	4¼

No. 144A C & L Blow Torches

C&L
No.144A
DETROIT

1-Quart Capacity

For Gasoline

For the mechanic who uses a blow torch occasionally.

The self-cleaning burner is supplied with non-enlargeable orifice and cleaner tip on control needle.

Produces an excellent flame.

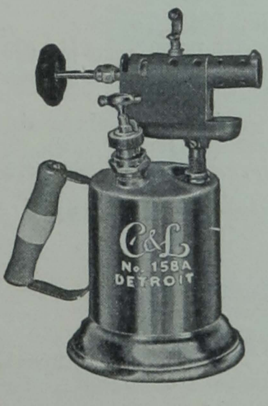
The pump is quick-acting having the T-handle and the lock-down feature for the pump plunger.

Shipping weight 4¾ pounds.

No. 144A.............each **$15.00**

No. 158A C & L Single Needle Torches

For Gasoline



For use in the home workshop, garage or farm.

Produces a good sized flame, is economical in fuel consumption and has a long burning life.

Burner is of extra high grade bronze and the sharp point, self-cleaning needle has a large shoulder to prevent orifice enlargement. Burner is protected by a windshield for use outdoors.

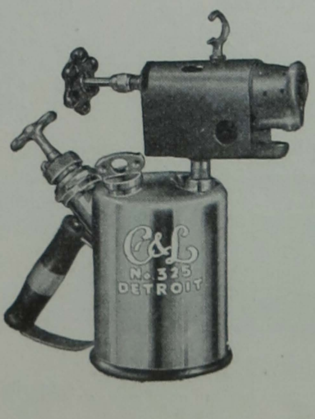
Tank is finished chromium-plated brass and the quick acting T handle pump has the lock down feature for the pump plunger.

No. 158A...........each	**$11.12**
Capacity.........quarts	1
Shipping Weight..pounds	4¾

No. 325 C & L Multi-Flame Torches

1-Quart Capacity

For Gasoline



The No. 325 Heavy Duty Torch has an extra powerful burner that produces a strong blue blast flame of remarkable volume and great heat intensity. Full flame control for heavy or light work. It will burn in any position.

Although this torch is regularly supplied for burning gasoline, by changing the burner jet, kerosene can be burned successfully.

Shipping weight, 5¾ pounds.

No. 325.........each **$21.90**

No. 600A C & L Blow Torches

1-Quart Capacity—For Gasoline

C&L
No. 600A
DETROIT

Designed for the occasional user who wants a torch to use on odd jobs under ordinary weather conditions.

Tank is highly finished buffed brass with concave bottom fitted with a brass filler plug. Control valve wheel is made of a heat resisting composition.

Pump is quick-acting, with the lock down feature for the pump plunger. Leaks are prevented by the patented interlocking fittings.

Shipping weight, 4¾ pounds.

No. **600A**............each **$9.00**

No. 700A C & L Torches

1 Pint Capacity

For Gasoline

C&L
No. 700A
DETROIT

Designed for use under ordinary weather conditions and where space is restricted.

Tank is highly finished buffed brass with concave bottom fitted with a brass filler plug. Control valve wheel is made of a heat resisting composition.

Pump is quick acting with the lock down feature for the pump plunger.

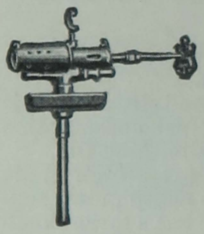
Leaks are prevented by the patented interlocking fittings.

Weight in individual carton, 3¾ pounds.

No. **700A**..................each **$9.00**

No. 3695 C & L Torch Burners

For No. 144A Torch



Cast from a special bronze mixture to withstand extreme heat and hard service.

Self-cleaning; with non-enlargeable orifice and cleaner tip on control needle.

No. **3695**...................each **$9.00**

Turner Hold Heat Soldering Coppers

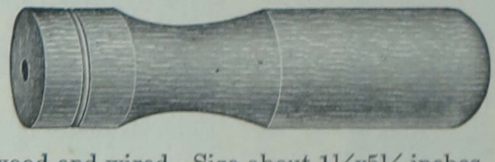
Forged from highest grade pure copper bars. Uniformly made and perfectly balanced. Clincher type handle, positively will not loosen, and will grip firmly as long as there is any copper left. Attractively finished in red.

Sizes from ¼ lb. to 12 lbs. per pair.

Wt. Lbs. Per Pair	Per Lb. Over Base	Wt. Lbs. Per Pair	Per Lb. Over Base
*3	Base	1	**$.06**
2½	**$.01**	¾	**.12**
2	**.02**	½	**.20**
1½	**.03**	¼	**.60**

*This price applies to 3-pound and heavier.

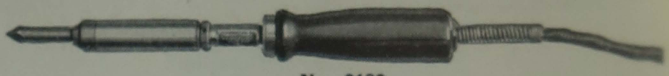
Soldering Copper Handles



Soft wood and wired. Size about 1¼x5½ inches.

Per Gross...................................**$54.00**

American Beauty Electric Soldering Irons

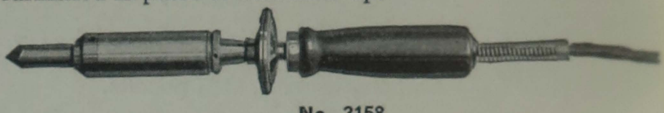


No. 3138

All irons except No. 3138 have special baffle-plate construction at shank to prevent free conduction of heat to handles. No. 3138 iron does not need baffle plate.

Copper tips are coated with pure nickel to prevent oxidation and corrosion.

Standard tips regularly supplied. Pointed tips can be supplied in place of chisel tips and vice versa; for No. 3138 iron a special long drawn semi-chisel shaped tip can be furnished in place of standard tip.



No. 3158

Stands are supplied with all irons.

Heating element core is machined from solid steel rod; outer surfaces are impregnated with zinc.

Made in all standard voltages. Will operate on a.c. or d.c. circuits. Can also be supplied for 32 volts.

No. 3138.—Primarily adapted for light work; radio, telephone, telegraph, ignition work, etc.

No. 3158.—For the same purposes as No. 3138 iron and for work of a somewhat heavier nature; for electric starter and ignition manufacturers, repair work, etc.

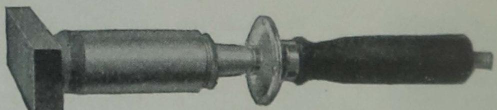
No. 3178.—For use on heavier work; connections, light commutators and for service and production work.

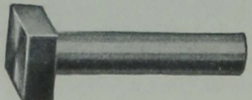
No. 3198.—For shop, service, production work, etc. Supplies a large volume of heat at high temperature.

Cat. No.	Each	Diam. Tip In.	Watts	Over All Inches		Weight Pounds	
				Lgth.	Diam.	Net	Ship
3138	**$7.20**	⅜	100	12⅞	⅞	1	2
3158	**8.60**	⅝	200	13⅝	1¼	1¾	3
3178	**11.50**	⅞	300	14⅜	1⁹⁄₁₆	2⅝	4
3198	**15.00**	1⅛	550	15	1¾	3¾	5¾

Branding Die Blanks

For American Beauty Electric Soldering Irons

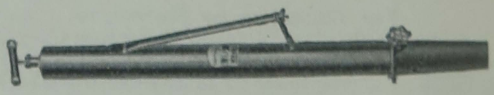




For hot-branding designs, trademarks, numbers, names, etc., on various materials, such as wood, leather, paper, skins, etc., adaptable for hot branding.

No.	Each	Size Die Surface In.	Thickness In.	Round Shank In.	Length Shank In.	To Fit Iron No.	Approx. Wt., Oz.
158-DB	**$2.25**	1 x1¾	7/16	⅝	2¾	3158	7
178-DB	**3.25**	1½x2¼	7/16	⅞	2¾	3178	14
198-DB	**4.50**	2 x3¼	½	1⅛	3⅜	3198	30

No. 50 Turner Blow Torches



Used by contractors for thawing out equipment and starting engines on winter jobs. Provides the ideal method of fighting fire with fire, or backfiring.

The backfiring torch is equipped with a coil burner of the firepot type that develops a wide spreading blue flame of intense heat. A sheet metal shield protects the burner.

The tank is made of heavy seamless brass tubing with brazed in ends. An adjustable handle can be folded flat, and a quick action brass pump serves as a filler plug.

Capacity of tank, ¾ gallon. Burns untreated gasoline.

Length, 41 inches; diameter, 3 inches.

Shipping weight, 14 pounds.

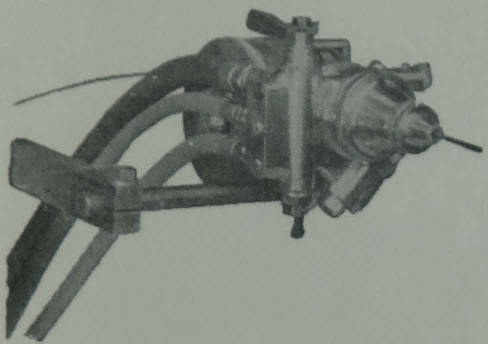
No. **50**.................................each **$18.50**

Metallizing Equipment

All metal spraying equipment operates more or less along the same lines. The basic principle of design is identical in any unit available today and variations between the different units can be traced to refinements of design and care in manufacturing as well as selection of materials entering into construction of units. But all units do not perform the same nor are the operating costs the same, so the efficiency of a metal spraying unit can best be measured by the quality of the coating deposited, the amount of metal lost during spraying, the amount of metal sprayed during a given time and the cost of spraying that amount.

The ideal metal spraying unit is that which completely atomizes the metal sprayed, which sprays with a minimum loss and which sprays a large volume of metal with a minimum amount of gas, oxygen and air.

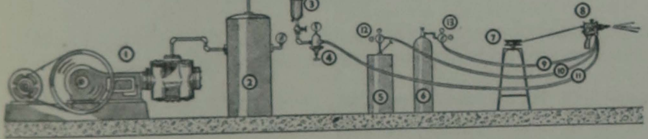
Mogul Guns



For machine shops, production work, oil refineries, and general maintenance work for spraying steels, zinc, aluminum, babbitt metal, bronzes, etc. Also handles lead and tin in 1/8-inch wire.

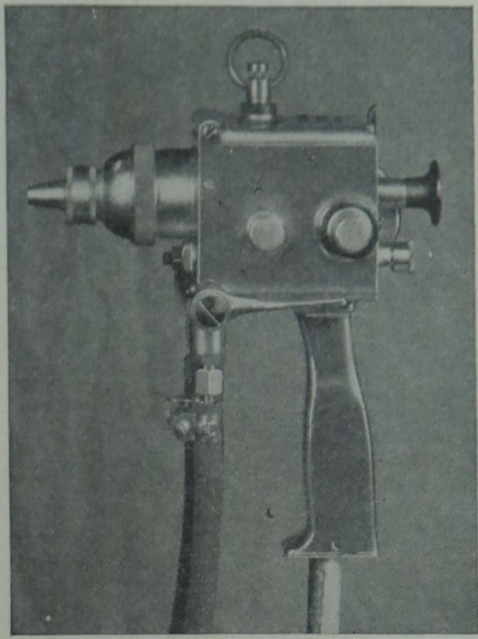
Complete with Tools	each	$500.00
B-Gearing to Increase Speeds of Deposit for Metals other than Steels	each	20.10
3/16-Inch Oxygen Hose, 3/16-Inch Acetylene Hose, or 5/16-Inch Air Hose	per 20 feet	9.20
Nose Type Respirator	each	5.00
Air Regulator	each	12.75
Oil and Moisture Filter	each	25.00
2-Stage Acetylene Regulator, Metallizing Type	ea.	33.00
2-Stage Oxygen Regulator, Metallizing Type	each	33.00
Wire Reel Stand	each	30.00
Cyclone Air Blast	each	15.00
Air Hose for Cyclone Air Blast	per 20 feet	4.00

Proper Metallizing Installation



1. Air Compressor
2. Air Receiver
3. Oil and Moisture Filter
4. Air Regulator
5 and 6. Oxygen and Acetylene Tanks Furnished by Your Gas Distributor or Acetylene Generator Can Be Used
7. Wire Reel Stand
8. Metallizer or Mogul
9. Oxygen Hose, 20-Foot Length 3/16-Inch
10. Acetylene Hose, 20-Foot Length 3/16-Inch
11. Air Hose, 20-Foot Length 5/16-Inch

3-in-1 Unit Metallizers

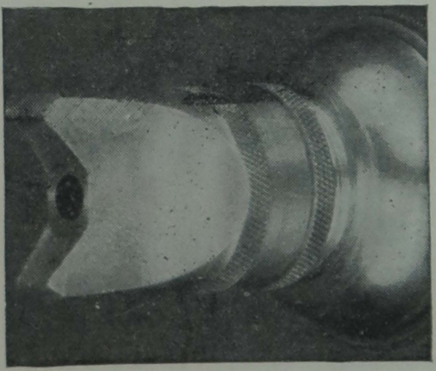


For high speed production spraying of lead and tin and smaller quantities of all other metals. Also recommended for use with extension equipment.

Each		$350.00
Tools and Box	per set	9.50

Other accessories the same as those listed for the Mogul.

Extension Equipment



Fan Spray Air Cap

Extension	feet	2	3
Complete with 1 Each No. 18, No. 15 and No. 10 Wire Nozzles	each	$26.00	$28.00
Angular Air Cap	each	9.50	
Straight Air Cap	each	6.00	
Fan Spray Air Cap	each	4.00	
Tool Post Holder	each	6.00	

Tank Spraying

For spraying in enclosed vessels and when spraying lead, tin or cadmium, we recommend Cessco Health-Guard Mask with sand blast helmet.

Mask and Helmet	each	$40.00

Service

Trained metallizing engineers are at your service at all times to assist you with special applications and metal coating problems.

Stocked in Denver for immediate shipment.

Metco Metallizing Wire

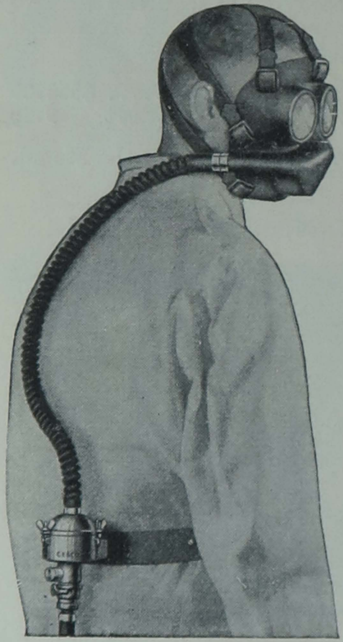
METCO

Trouble-free, dependable wire; made with extreme care to work perfectly with metal spray guns.

Pure Lead
Lead Alloy
Pure Zinc
Zinc Alloy
Copper
Tin
High Brass
Low Brass
Solder Wire
Steel
  .10, .40, .80, .120 Carbon
Babbitt
Stainless Steel
Tobin Bronze
Fine Silver
Nichrome
Everdur
Cadmium
Nickel Silver
  (10%, 18%, 30%)
Aluminum
Monel Metal
Phosphor Bronze
Pure Nickel
Commercial Bronze
Aluminum Bronze Wire

Prices upon application.

No. 601 Healthguard Sandblast Masks



Designed for sand and shot blasting and other operations where harmful dusts are encountered. Has been laboratory tested and carries an efficiency rating of over 99 per cent.

Has a soft moulded rubber face piece, designed to adapt itself to any facial contour and when in position, the interior becomes sealed against all outside air, preventing the entrance of dust particles.

Complete weight, less than 50 ounces.

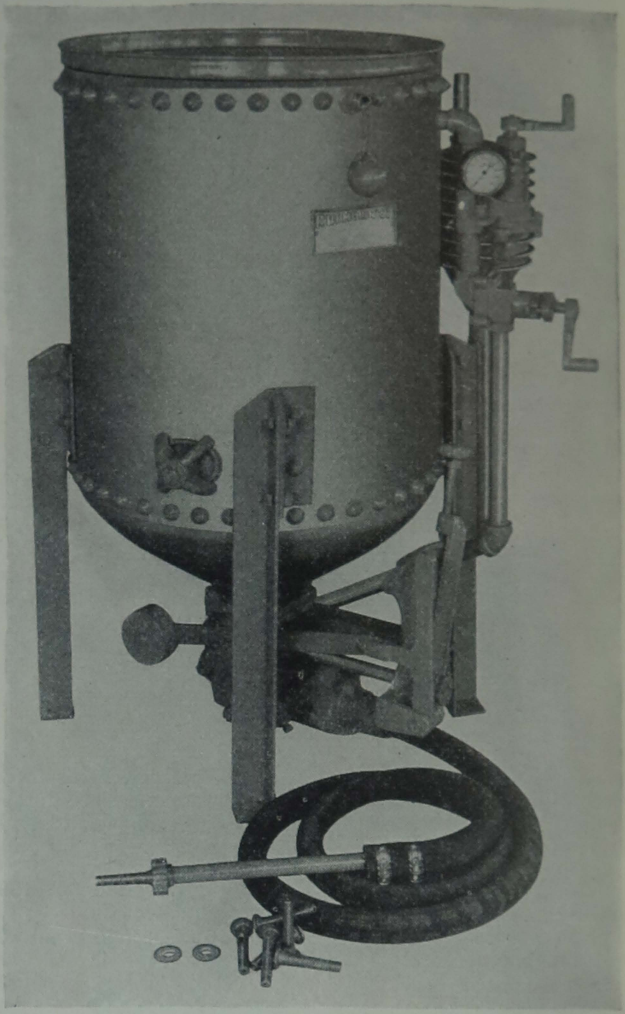
No. **601**, without Hood.........each **$36.00**
No. **601**, with Canvas Hood........each **40.00**
No. **601**, with Leather Hood........each **46.00**
No. **601**, with Cesco Shotblast Hood..............each **52.00**

No. 89 Air-Fed Respirators

Offer complete protection against the inhalation of harmful gases, fumes, vapors and dust, and are designed for use with compressed air. When in position, the interior becomes sealed against outside contaminated air. Air under pressure enters filter unit and passes through a filter cartridge where foreign particles and odors are removed. The clean air is then carried to the facepiece, allowing a free and continuous flow. Constant circulation assures comfort, coolness and an ample supply of clean pure air. Exhaled air is released by positive exhaust valve with 1 way action which precludes the possibility of outside contaminated air entering the facepiece.

No. **89**, with Filter Unit......................each **$18.00**

Ruemelin Master Sandblast Generators



Especially suitable for monument shops, granite factories, stone sheds, and glass plants. It is used for deep or shallow carving, cleaning of stone, frosting, etc.

By the movement of a hand lever locked by segment the abrasive is controlled for density of mixture, for nozzle opening or size and class of abrasives. Obstructions in the sand valve are quickly removed.

Pure rubber valves in all sand passages prevent wear.

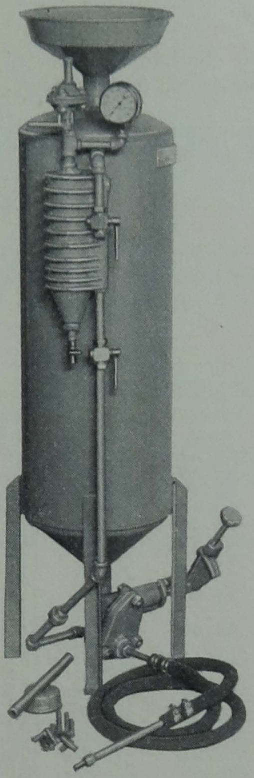
Safe steel heavy riveted tank with unbreakable legs. Tested at 150 pounds; working pressure 100 pounds.

Handles all abrasives—sand, steel grit, steel shot, silicon carbide.

Choked sand passages and nozzles are prevented by efficient moisture expeller which eliminates water in the compressed air supply. A water drain cock is provided.

Size Cubic Feet	Each	Capacity, Pounds Sand	Capacity, Pounds Steel	Diam. Tank Inches	Height Over All Inches	Wts. Lbs.
½	**$55.00**	50	125	8	22	35
1¼	**85.00**	120	300	12	33	130
2	**100.00**	200	500	12	42	180
3	**105.00**	300	750	14	47	210
4	**170.00**	400	1000	22	44	390
6	**205.00**	600	1500	22	51	425
7	**215.00**	700	1775	26	48	725
7½	**230.00**	750	1875	26	48	800
10	**255.00**	1000	2500	26	54	870
15	**375.00**	1500	3750	30	70	1200

Ruemelin Junior Sand Blast Generators



Used for carving fine or narrow lines, for sharpening the points of V sunk letters, etc.

Operates successfully on 10 to 20 cubic feet of air per minute.

The intense cutting force of the blast is by the direct mixing process. Machine is controlled by single air lever; sand lever remains set.

Automatic mixer box has quick accessibility and automatic sand control. Speeds up operations and prevents choking of nozzle. Sand lever is only used for adjusting the amount of sand.

Has simple and durable sand valve for controlling sand mixture by means of rubber hose valve.

Triple air valve avoids wear and air leakage. Condensing type air dryer eliminates moisture troubles. Choke relief valve removes obstructions from tank. Funnel bottom tank drains all contents. All steel tank is tested to 300 pounds pressure.

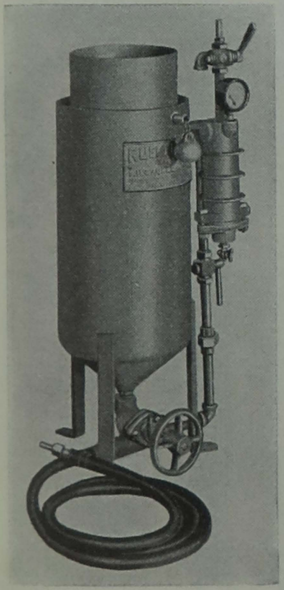
Made in two sizes: for portable use, 120 pounds sand capacity sufficient for one hours' sandblasting with 3/32-inch nozzle or for one-half hour with ⅛-inch nozzle; for stationary use, 200 pounds sand capacity sufficient for two hours' sandblasting with 3/32-inch nozzle or one hour with ⅛-inch nozzle.

Weight: 120-pound sand capacity machine, 75 pounds; 200-pound sand capacity machine, 109 pounds.

Prices and further information upon application.

Ruemelin Midget Sand Blast Generators

50-Pound Sand Capacity (½ Cubic Foot)



This generator is successfully applied to a great variety of uses including: Lettering of memorials in the cemetery; carving of glass signs and glassware; stripping of paint from auto bodies and wire wheels; preparing metal surfaces previous to metallizing; welding or painting; removing of rust, scale, etc.

Will work with any abrasive including steel shot, grit, sand, and artificial abrasives.

Practical for portable work because of its light weight. Operates with small nozzles, reducing the compressed air requirements to a minimum.

Sturdily built to deliver real service. Develops an intense blasting action, providing rapid cleaning or carving at low cost.

Features include the automatic mixer box; rubber-lined mixing valve; choke relief valve; quick filler top and a water extractor.

Tank is equipped with funnel bottom; drains all abrasives; durable all-steel construction. Tested to 300 pounds. Diameter, 8½ inches; height, 22 inches overall. Furnished with 5/64 and 3/32-inch nozzles. 1/16-inch nozzles can be furnished for a very small generator.

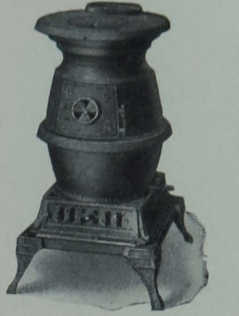
Equipped with 10 nozzles, 7 feet hose, gauge, filler sieve, nozzle holder, water extractor and directions.

Can be furnished with blast control valve at an extra charge.

Shipping weight, 58 pounds.

Complete information and prices upon application.

Ajax Heating Stoves



Ajax Stoves are made in 5 sizes, which gives them a wide range of adaptability. Each size is correctly designed and properly proportioned.

The different castings which compose the stove, especially the fire bowls and grates, are heavy enough to give real service and genuine satisfaction to the user.

It is carefully fitted, strongly bolted together, and neat in appearance.

Equipped with shaking grates, supported by grate rests. Drafts are controlled by tight fitting, sliding dampers on the ash doors, and revolving dampers on the feed doors.

Will burn hard or soft coal, or crushed coke.

No.	Ht., In. Stove	Ht., In. Legs	Diam., In. Top Plate	Diam., In. Lid	Size Smoke Pipe In.	Size Feed Door Opening In.	Inside Diam. Fire Bowl, In. At Top	Inside Diam. Fire Bowl, In. At Bottom
1	28¾	7	11¼	5⅝	6	4¼x5¾	10⅝	7
2	30¾	7	12¼	6⅝	6	5 x6⅜	11¾	8⅛
3	32⅜	7	13⅞	7 1/16	6	5⅝x6¼	13	9½
4	34¼	7	15⅜	7⅛	6	6¼x7	14½	10¾
5	36⅞	7	17⅞	8	7	6⅜x7	16	12¼

No.	Diameter Grate Inches	Size Ash Pit Inches	Size Ash Pit Door Opening Inches	Floor Space Required Inches	Weight Pounds Stove Complete
1	6¼	9¼x8¾x3⅞	3⅞x7½	16x17¼	63
2	7⅜	10½x9¾x4¼	4¼x8½	17¾x19	75
3	8¾	13x13x4⅛	4⅛x10	19x20½	100
4	10⅛	14½x14½x4½	4½x11⅜	20½x21½	123
5	11	16x16x5½	4¾x13	21½x22¾	161

Prices upon application.

Nested Stove Pipe

Made of refined iron, locked, grooved, beaded, crimped and oiled, is complete except the pounding down of the lock.

Furnished in 4, 4½, 5, 5½ and 6-inch diameters in 24, 26 and 28-gauge.

Twenty-five lengths are packed in a bundle. Takes up little room and can be shipped at a low freight rate.

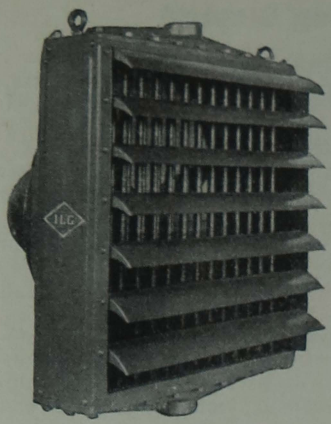
Prices upon application.

Corrugated Stove Pipe Elbows

The corrugations make the elbow stiff and prevent it from damage in transit. Elbow is electric welded, not riveted, and has 2½-inch ends. Elbows are shipped in bundles of one dozen each size, securely wired.

Furnished in the following sizes: 3, 4, 4½, 5, 5½, 6, and 7-inch diameters and 26, 28, 29 and 30-gauge.

Prices upon application.



Ilg Unit Heaters

Powerful Ilg self-cooled motor propeller fan enables a stream of warm air to be concentrated at the floor level and minimizes heat loss above the working zone. Ordinarily suspended by eye bolts 7 or 8 feet from the floor.

Can be operated manually, by electric thermostat, or steam regulator. Uniformity of design and construction assures balanced performance.

Controllers: Single-phase 2-speed motors are equipped with controllers having 2 speeds and an off position; single phase 3 speed motors are equipped with controllers having 3 speeds and an off position; 2 speed controllers are available for 2 and 3-phase motors in each speed as extra equipment; variable speed d.c. motors are equipped with enclosed speed regulators.

Unit heater prices include fan, motor, casing, individually adjusted air deflectors, and heating element. Speed regulator is included where specifically stated. No air valves or other accessories are included.

		60 Cycle A.C.				D.C.								
		1-Phase 110 or 220 Volts			2-3-Phase 220 or 440 Volts	110 or 220 Volts								
Size	R.P.M.	Constant Speed	2 Speed	3 Speed	Constant Speed	Constant Speed	Variable Speed	B.T.U.	Leaving Temp. Deg. F.	†C.F.M.	Watts	**E.D.R.	Condensation.	Wt. Lbs.
10S3	1550	$37.50	......	$38.60	......	$38.20	$38.60	18600	102	410	40	77.5	19.4	90
10S5	1550	47.20	......	49.00	......	48.40	49.00	24400	118	390	40	102	25.4	90
10S7	1550	52.80	......	55.40	......	55.00	55.40	28400	130	375	41	118	29.6	90
13-1-T5	1140	57.70	......	60.80	......	60.30	60.80	32000	123	475	60	133	33.1	112
*13-1-S5	1140	60.80	......	64.20	......	63.70	64.20	34400	120	560	65	143	35.6	112
13-1-T7	1140	63.50	......	67.80	......	67.30	67.80	37000	135	440	65	154	38.3	112
13-1-S7	1140	66.50	......	71.40	......	70.80	71.40	40000	133	520	70	167.	41.4	112
13T5	855	76.80	......	......	......	......	......	41500	134	520	35	173.	43.	140
13T5	1140	76.80	$83.00	85.00	......	83.00	85.00	53900	128	700	55	224.	55.8	140
13T7	855	78.70	......	......	......	......	......	48000	146	480	35	195.	49.6	140
13T7	1140	78.70	84.80	88.00	......	84.80	88.00	57800	141	650	55	240.	60.	140
13H5	855	81.80	......	......	......	......	......	54000	128	590	60	230.	56.	140
13H5	1140	81.80	88.80	92.20	......	88.80	92.20	66200	121	960	95	282.	68.5	140
13H7	855	84.50	......	......	......	......	......	57800	141	650	65	240.	60.0	140
13H7	1140	84.50	91.00	95.00	......	91.00	95.00	72500	133	880	100	310.	75.	140
*13S5	1750	86.50	93.50	98.00	......	93.50	98.00	79600	115	1280	200	340.	82.5	150
13S7	1750	89.00	96.60	101.20	......	96.60	101.20	87300	126	1180	210	373.	90.5	150
17T5	855	90.80	......	......	......	......	......	77600	128	1060	90	330.	80.5	196
17T5	1140	90.80	99.00	104.40	$96.40	99.00	104.40	94500	121	1420	130	400.	98.	196
17T7	855	95.00	......	......	......	......	......	86200	139	980	90	368.	89.5	196
17T7	1140	95.00	104.50	110.40	100.00	104.50	110.40	107000	132	1310	130	445.	111.	196
*17H5	855	97.80	......	......	......	......	......	94500	121	1410	100	400.	98.	196
*17H5	1140	97.80	108.20	114.60	103.30	108.20	114.60	115500	115	1920	175	480.	120.	196
17H7	855	107.20	......	......	......	......	......	106500	133	1310	100	445.	110.	196
17H7	1140	107.20	118.00	127.40	112.40	118.00	127.40	139600	125	1770	175	580.	145.	196
*17S5	1750	104.00	115.00	125.00	110.00	115.00	125.00	133000	108	2560	375	555.	138.	210
*17S7	1750	114.00	124.00	134.50	118.40	124.00	134.50	153500	117	2360	375	640.	159.	210
*19T5	855	110.00	......	......	......	......	......	119000	124	1730	90	495.	123.	244
*19T5	1140	110.00	120.30	130.60	114.60	120.30	130.60	145000	117	2300	185	605.	150.	244
19T7	855	118.00	......	......	......	......	......	134500	135	1590	90	560.	139.	244
19T7	1140	118.00	128.50	140.00	122.20	128.50	140.00	162000	128	2100	185	675.	168.	244
*19H5	855	123.50	......	......	......	......	......	148000	117	2280	120	615.	153.	244
*19H5	1140	123.50	132.60	144.50	126.00	132.60	144.50	170000	110	3080	350	710.	176.	244
*19H7	855	142.00	......	......	......	......	......	164000	128	2130	120	685.	170.	244
*19H7	1140	142.00	150.00	163.40	141.60	150.00	163.40	195000	120	2830	350	810.	202.	244
*19S5	1750	142.00	150.00	163.40	141.60	150.00	163.40	195000	105	4100	800	810.	202.	255
*19S7	1750	162.40	171.40	187.00	162.00	171.40	187.00	223000	113	3800	800	930.	231.	255
25T5	685	142.00	......	......	......	......	......	169000	129	2300	185	705.	175.	450
25T5	855	142.00	150.00	162.00	142.00	150.00	162.00	193000	124	2800	400	805.	200.	450
25T7	685	158.00	......	......	157.00	......	......	187500	141	2100	190	770.	194.	450
25T7	855	158.00	166.00	181.00	157.00	166.00	181.00	216000	136	2550	400	900.	224.	450
*25H5	685	170.00	......	......	169.00	......	......	201000	123	2960	220	835.	208.	450
*25H5	855	170.00	178.00	194.00	169.00	178.00	194.00	232000	118	3700	475	965.	240.	450
25H7	685	190.00	......	......	190.00	......	......	222000	135	2700	220	925.	230.	450
25H7	855	190.00	201.00	220.00	190.00	201.00	220.00	261000	129	3400	475	1090.	270.	450
*25S5	1140	188.00	198.00	215.00	187.00	198.00	215.00	257000	114	4350	600	1070.	266.	465
25S7	1140	210.00	222.00	241.00	208.00	222.00	241.00	287000	124	4000	660	1200.	297.	465
*‡19-2T5	855	211.00	......	......	......	......	......	238000	124	3460	180	990.	247.	450
*‡19-2T5	1140	211.00	223.00	243.00	211.00	223.00	243.00	290000	117	4600	370	1210.	300.	450
‡19-2T7	855	236.00	......	......	......	......	......	269000	135	3180	180	1120.	280.	450
‡19-2T7	1140	236.00	250.00	272.00	236.00	250.00	272.00	324000	128	4200	370	1350.	337.	450
*‡19-2H5	855	247.00	......	......	......	......	......	296000	117	4560	240	1230.	308.	450
*‡19-2H5	1140	247.00	261.00	285.00	247.00	261.00	285.00	340000	110	6160	700	1420.	354.	450
*‡19-2H7	855	284.00	......	......	......	......	......	328000	128	4260	240	1370.	340.	450
*‡19-2H7	1140	284.00	300.00	327.00	284.00	300.00	327.00	390000	120	5660	700	1620.	405.	450
*‡19-2S5	1750	284.00	300.00	327.00	284.00	300.00	327.00	390000	105	8200	1600	1620.	405.	500
*‡19-2S7	1750	324.40	343.00	373.00	324.00	343.00	373.00	446000	113	7600	1600	1860.	464.	500
31T5	685	217.00	......	......	220.00	......	......	259000	128	3500	350	1080.	268.	550
31T5	855	217.00	230.00	250.00	220.00	230.00	250.00	298000	124	4350	540	1240.	308.	550
31T7	685	244.00	......	......	244.00	......	......	284000	140	3200	350	1180.	294.	550
31T7	855	244.00	256.00	278.00	244.00	256.00	278.00	332000	135	4000	540	1380.	344.	550
*31H5	685	263.00	......	......	263.00	......	......	312000	121	4700	460	1300.	323.	550
*31H5	855	263.00	278.00	303.00	263.00	278.00	303.00	361000	117	5850	700	1500.	372.	550
31H7	685	298.00	......	......	298.00	......	....	345000	133	4400	460	1440.	357.	550
31H7	855	298.00	316.00	344.00	298.00	316.00	344.00	410000	128	5400	700	1710.	425.	550
*31S5	1140	290.00	305.00	332.00	290.00	305.00	332.00	397000	113	6900	1300	1680.	410.	570
31S7	1140	334.00	353.00	385.00	334.00	353.00	385.00	458000	124	6350	1300	1910.	475.	570

*These unit heaters have low leaving temperatures which make them particularly suitable for high ceilinged rooms.

Ratings apply only to recirculation and free discharge; †Cubic feet per minute of standard air at 70° F. and standard basis of rating (2 pounds steam pressure and 60° F. entering air): **Equivalent direct radiation at standard basis of rating.

‡Double fan unit.

For constant speed units equipped with explosion proof motors add 10%. Prices on variable speed explosion proof motors on application. Explosion proof motors are not available for No. 10 and No. 13-1 series excepting the No. 13-1 for single phase which carries an extra of $19.00.

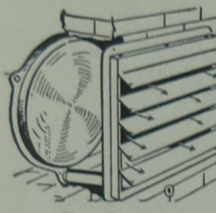
For 25 cycle add 10% to price of 60-cycle unit of nearest r.p.m.

Where 50 cycle motors are required use 60 cycle prices.

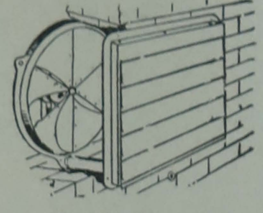
Where steam pressure is referred to as a condition of rating, it is meant to be the gauge pressure maintained on the heating surface and to determine the pressure required at the boiler a suitable line drop must be allowed for.

Where heaters are to handle air at temperatures below freezing, it is recommended that a minimum pressure of 5 pounds gauge should be maintained on the heating surface.

Ilg Automatic Shutters



Fan Running



Fan Not Running

These shutters are used on the outside of propeller fans to protect the fan when not running and also to keep out the wind, rain, snow and cold.

Ilg Automatic Shutters are built of special hard rolled aluminum leaves, pressed on Whiting Alloy copper coated rods supported in cast frame.

When fan is running, the shutter is held open by the force of the air current. When fan is shut off, the shutter closes automatically by gravity.

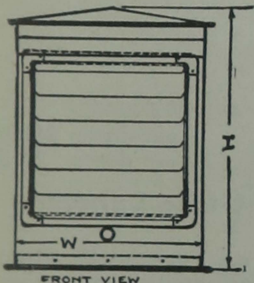
Shutters are moisture proof and need no attention after they are installed.

Size of shutter corresponds to size of fan.

Sizes 48-inch and larger are built in two sections.

Size Inches	Approx. Shipping Wt., Lbs.	Price Each	Size Inches	Approx. Shipping Wt., Lbs.	Price Each
12	10	$8.00	36	112	$52.00
16	19	11.00	42	152	75.00
18	30	13.00	48	188	100.00
20	43	16.00	54	195	120.00
24	67	19.00	60	210	170.00
30	80	36.00	72	314	190.00

Ilg Power Roof Ventilators



Pent-House with Automatic Shutter

The Ilg Power Roof Ventilator is for buildings where roof ventilation provides the only practical means of exhausting foul air.

With this ventilator there is a constant suction created by the Ilg Self-Cooled Motor Propeller Fan which is enclosed in the penthouse. The foul, dead air and excess heat are positively and uniformly drawn off by the action of the fan. Wind and weather can have no effect.

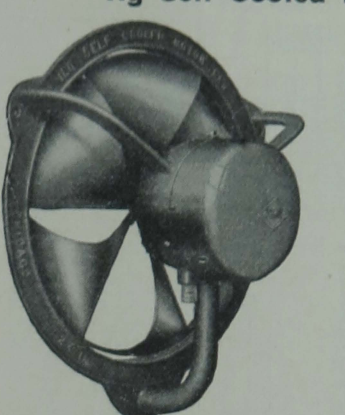
Placed above machines in special processes and connected by duct work, the unit serves as a fume or smoke and heat exhauster. Since heat's natural direction of travel is upward, the Ilg Power Roof Ventilator has found wide use in every industry confronted with excessive heat.

The Ilg Self-Cooled Motor Propeller Fan is mounted within a sheet steel penthouse. Solidly constructed over a heavy angle iron frame, the house is weathertight in every respect.

Furnished complete with shutter. Prices do not include fan.

Size Ventilator In.	Standard Each	Insulated Each	Size Shutter & Fan In.	Penthouse Dimen., In. Depth	Width	Ht.	Ga. Metal	Ship. Wt. Lbs.
12	$63.00	$92.00	12	16	20	30	20	90
16	63.00	94.00	16	16	20	30	20	95
18	73.00	115.00	18	18	24	36	18	105
20	84.00	131.00	20	18	26	36	18	135
24	99.00	147.00	24	21½	30	42	18	170
30	142.00	199.00	30	25¼	36	49	18	235
36	189.00	250.00	36	27¼	44	58	18	400
42	280.00	350.00	42	32	50	62	18	580
48	360.00	450.00	48	36	56	72	18	740
54	550.00	660.00	54	40	63	82	16	820
60	630.00	770.00	60	44	69	98	16	910
72	930.00	1100.00	72	48	82	102	16	1070

Ilg Self-Cooled Propeller Fans



The round-bodied motor fits into a cast iron ring supported by forged arms fastened to the outer ring. This makes it possible to interchange or replace motor without disturbing the alignment. Frame and motor can be installed separately, thus dividing weight.

The vacuum that is created at the axis of the motor draws a current of cool air from the outside over the motor, after which it is carried away with the general exhaust.

Constant Speed, Single-Phase
110 or 220 Volts, 60-Cycle

Size In.	Type	Each	Speed R.P.M.	C.F.M.	Watts Input	Motor Frame No.	Ship. Wt. Lbs.
9½	Ilgette	$22.00	1550	450	40	41	12
12	Ilgair	38.00	1140	750	70	13	23
16	Ilgair	65.00	855	1000	100	15	48
16	SH	63.00	1140	1400	100	15	48
18	SH	90.00	1140	2300	170	375A	80
24	SH	146.00	855	4100	275	D102	186
30	SH	220.00	685	7300	350	D101	215
36	SH	330.00	570	9650	500	D104	440

*Two Speed, Single-Phase
110 or 220 Volts, 60-Cycle

Size In.	Type	Each	Speed R.P.M.	C.F.M.	Watts Input	Motor Frame No.	Ship. Wt. Lbs.
16	S	$84.00	855 1140	1000 1400	100	15	65
18	S	115.00	855 1140	1750 2300	170	D87	90
20	S	136.00	855 1140	2400 3200	250	D87	130
24	S	193.00	600 855	2880 4100	275	D102	190
30	S	252.00	500 685	5420 7300	450	D101	265
36	S	360.00	400 570	6900 9650	500	D104	500
†42	S	425.00	380 490	9800 12300	800	D104	675

*Two speed controller included.

†220 volts only.

For 50-cycle use same list price; speeds and capacities are 5/6 of those shown for 60-cycle.

A.C., 50-60-Cycle, 2 or 3-Phase

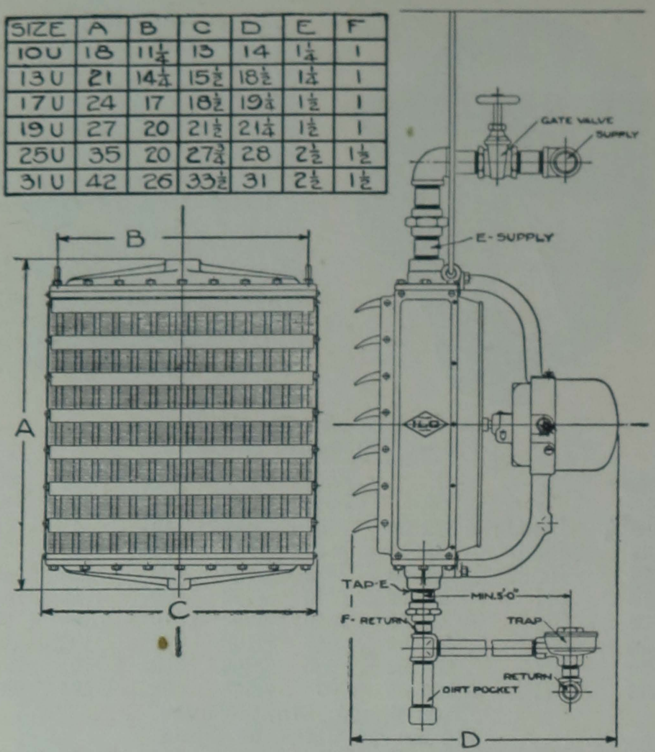
Size In.	Type	220 or 440 Volts Each	550 Volts Each	Speed R.P.M.	C.F.M.	Watts Input	Motor Frame No.	Ship. Wt. Lbs.
18	M	$122.00	$149.00	1140	2300	120	87	100
20	M	136.00	169.00	1140	3200	200	87	150
24	M	157.00	189.00	855	4100	250	102	225
30	M	189.00	220.00	685	7300	400	101	325
36	ML	304.00	346.00	490	8300	460	104	450
36	M	304.00	346.00	570	9650	460	104	460
42	M	350.00	390.00	490	12300	800	104	630
48	M	470.00	480.00	490	18400	1300	105	780
54	M	820.00	920.00	425	23200	1950	107	900
60	M	1030.00	1180.00	380	28400	2000	108	1150
72	M	1220.00	1380.00	315	40500	2100	109	1600

D.C., 50-60-Cycle, 2 or 3-Phase

Size In.	Type	110 or 220 Volts Each	500 Volts Each	Speed R.P.M.	C.F.M.	Watts Input	Motor Frame No.	Ship. Wt. Lbs.
12	Ilgair	$42.00	....	1140	750	70	100	35
16	B	73.00	....	1140	1400	100	1/8	65
18	B	105.00	....	1140	2300	150	1/6	90
24	A	210.00	$220.00	855	4100	300	1197	235
30	A	252.00	265.00	690	7300	440	1199	345
36	A	378.00	397.00	570	9650	600	1207	450
42	B	440.00	462.00	490	12300	800	1207	625
48	B	590.00	620.00	490	18400	1300	1211	890
54	B	870.00	913.50	425	23200	1800	1213	1025
60	B	1200.00	1260.00	380	28400	2270	1215	1520
72	B	1340.00	1407.00	315	40500	2300	1217	1980

Enclosed speed controllers furnished with all d.c. fans except the Type 12 size.

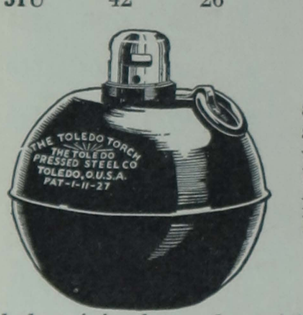
Ilg Unit Heaters



SIZE	A	B	C	D	E	F
10U	18	11¼	13	14	1¼	1
13U	21	14¼	15½	18½	1¼	1
17U	24	17	18½	19¼	1½	1
19U	27	20	21½	21¼	1½	1
25U	35	20	27¾	28	2½	1½
31U	42	26	33½	31	2½	1½

Size	Dimensions, Inches A	B	C	D	E	F
10U	18	11¼	13	14	1¼	1
13U	21	14¼	15½	18½	1¼	1
17U	24	17	18½	19¼	1½	1
19U	27	20	21½	21¼	1½	1
25U	35	20	27¾	28	2½	1½
31U	42	26	33½	31	2½	1½

Toledo Torches



This torch rights itself from any position; uses kerosene; has a capacity of 3 quarts; is equipped with the Economy Burner and burns up to 48 hours on 1 filling; finished in high luster black, baked enamel; packed 3 per box.

Leader

Made from 20-gauge steel; halves joined together with leak-proof double seamed joint. Weight, 5½ pounds.

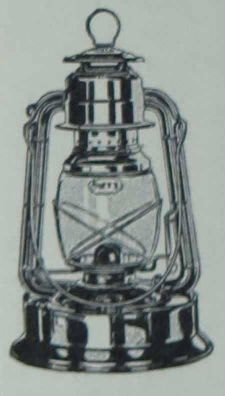
Each	**$1.50**

Champion

Made of 14-gauge steel and is welded at the seam. Weight, 6½ pounds.

Each		**$2.00**
Extra Wicks	per dozen	1.50

Dietz Little Giant Lanterns



Given a full supply of oil and a clean wick, turned up to moderate flame, these lanterns furnish a bright, dependable light continuously for 3 days, in any kind of weather. They will burn over a week-end without attention.

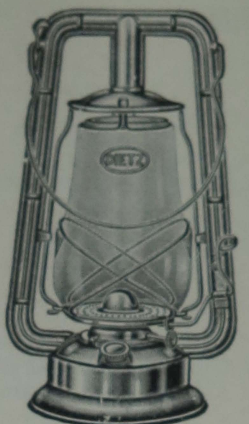
Height, 11½ inches; wick, ⅝ inch. Light, 6 c.p.; globe, Dietz Little Wizard Loc-Nob. No. 201 steel burner. Oil, 150° kerosene. Burns 70 hours.

The broad base and low center of gravity make it almost impossible for the lanterns to be blown over.

Terne plate, rust-resisting bottoms. Furnished in bright tin. Packed 1 dozen in a box.

With White Globe	per dozen	**$17.50**
With Ruby Globe	per dozen	**20.50**

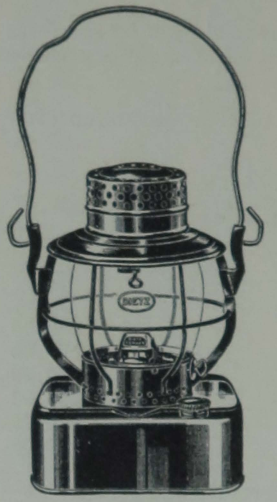
No. 0 Dietz Monarch Lanterns



For kerosene. Air circulation is excellent. Bright tin finish. With a green or ruby globe it is used as a police traffic lantern. Oil used, 150-degree kerosene. Fitted with Dietz Fitzall Loc-Nob globes.

Height Over All	in.	13½
Volume of Light by Test	c.p.	4
Size of Wick	in.	⅝
Fount Capacity	hrs.	30
Patent Steel Burner	No.	411
With White Globe	doz.	**$13.00**
With Genuine Ruby, Blue or Green Globes	doz.	**16.00**

Dietz 8-Day Lanterns



For municipalities, contractors and utilities.

This railroad type, kerosene lantern is of nontubular construction which necessarily reduces candle power through the slower consumption of oil.

Designed to burn with a low flame. With flame properly regulated it will burn 200 hours.

The fount is made of cold rolled steel, non-tip square shape. Size, 6x6½ inches. Capacity, 42 ounces.

Has a Dietz Genuine Ruby Little Wizard Globe.

The top is made of cold rolled steel constructed for proper drafting. Has space for ownership marking in the metal of the top disc.

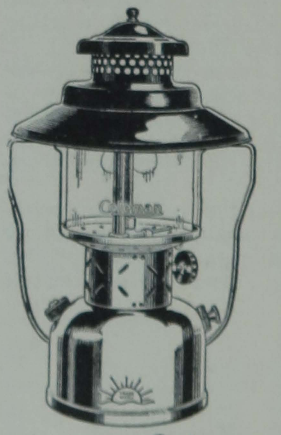
Height, with bail down, 9½ inches.

Standard finish, red enamel.

Standard package, one dozen. Weight, 38 pounds.

Complete, with Clear Globe	per dozen	**$17.50**
Complete, with Solid Color Globe	per dozen	**20.50**

No. 228B Coleman Instant-Lite Lanterns



Fitted with Pyrex globe, Roto-Type burner, built-in pump, and hand-operated filler plug.

Also has 8¾-inch porcelain enamel top, the underside of which is white enamel to aid in reflecting light downward.

Fount is 6 inches in diameter, finished in polished nickel, and holds 2 pints of fuel, enough for 12 to 15 hours' service.

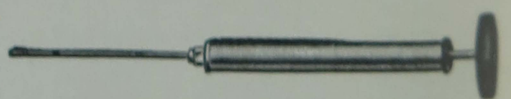
Overall height 14¼ inches.

Packed 1 lantern in carton with 2 mantles and a wrench.

Shipping weight 7 pounds.

No. 228B	each	**$7.95**

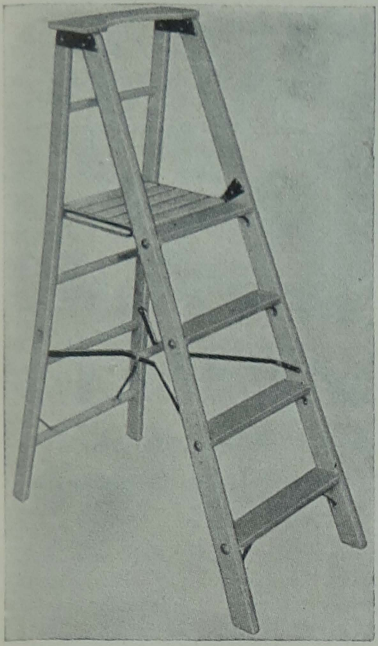
Coleman Suction Pumps



Designed to clean lamp or lantern founts or stove tanks; should be used occasionally before refilling to remove any dirt that may have collected in the bottom.

Suction Pump	each	**$1.35**

Type B Duo Safety Heavy Duty Ladders



This is a heavy duty, all-purpose step ladder. Very adaptable because of its rung-back construction and its large platform.

Has 30 degree angle of stability, thus reducing tipping hazard.

Angle braces and truss rods under each step. Platform is large enough (16x18 inches) so that two men can work on it at one time.

Vertical distance from work platform to top shelf, 24 inches. Large tool shelf 7x20 inches.

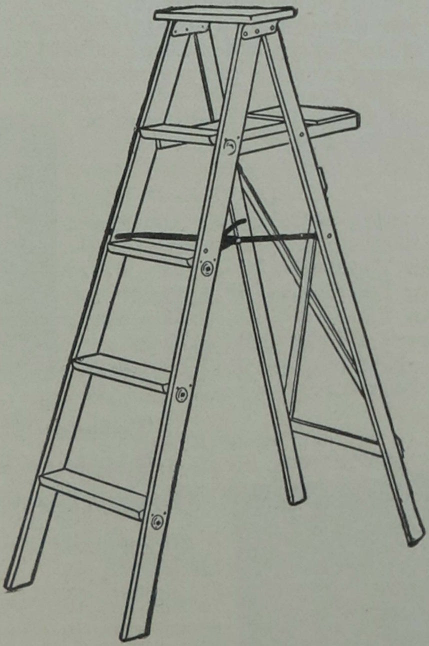
Placement of steel parts to inside minimizes danger of electrical current. Axial lock rigidly braces ladder in open position.

Rungs of second growth hickory.

No.	Each	Platform Height, Ft.	Height to Tool Rack, Ft.	Ceiling Height, Ft.	Weight Pounds
5B	**$8.25**	2 7/12	4 7/12	9 1/12	22
6B	**9.95**	3 2/3	5 7/12	10 1/6	29
7B	**11.50**	4 7/12	6 7/12	11 1/12	32
8B	**12.95**	5 1/2	7 7/12	12	36
10B	**15.25**	7 1/3	9 7/12	13 5/6	45
12B	**17.95**	9 1/6	10 5/6	15 2/3	60
14B	**21.50**	10 5/6	12 5/6	17 1/3	72
16B	**25.50**	12 2/3	14 2/3	19 1/6	90
18B	**28.95**	14 5/12	16 5/12	20 11/12	105
20B	**31.95**	16 1/4	18 1/4	22 3/4	120

No. 611 Hoosier Step Ladders

Full Rodded



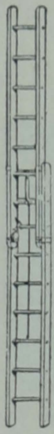
This is a good medium priced ladder. Equipped with the wood handle spreader feature. Made of Arkansas soft pine and all parts are firmly riveted together. Light construction.

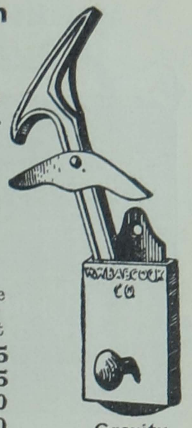
The Hoosier is also equipped with pail shelf and rod under each step.

Made in 4, 5 and 6-foot lengths only. Shipping weight about 3½ pounds per foot of ladder.

No. **611**..................................per foot **$.35**

General Purpose Extension Ladders





Gravity Lock

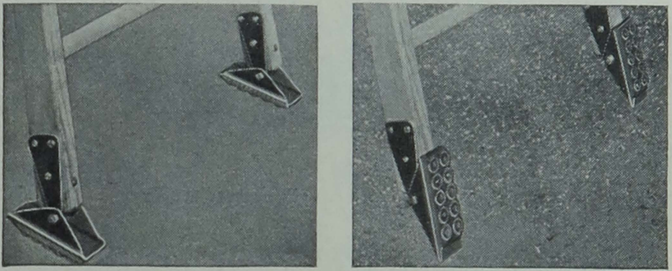
Manufactured from clear spruce with hickory rungs; malleable gravity hook or lock; rope and pulley complete; ready to use.

Spread at bottom for general use.

Each ladder has two sections of equal length.

Length Extension Feet	Price per Foot	Length Extension Feet	Price per Foot
20	**$.60**	32	**$.65**
22	**.60**	34	**.65**
24	**.60**	36	**.70**
26	**.60**	38	**.70**
28	**.60**	40	**.75**
30	**.60**	44	**.75**

Duo-Safety Ladder Shoes



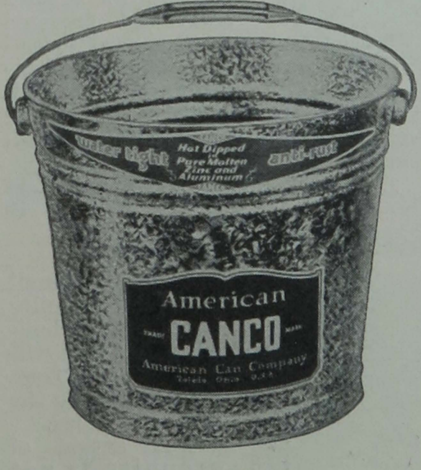
Ladders cannot slip, creep or skid when equipped with Duo-Safety Ladder Shoes. The injuries caused by ladders slipping can be eliminated almost entirely by equipping them with suitable safety shoes. These shoes will fit practically any size ladder rail. They can be used both indoors and outdoors by merely flipping the shoe from the horizontal to the vertical position.

Gripping and suction properties make it adaptable for most surfaces. Can easily be attached to the side rails.

All metal parts of these shoes are cadmium plated to insure them against rusting.

Sharp spike toe is made of case hardened steel. Vacuum pad sole made of pure gum rubber; 10 square inches of suction-gripping area to the sole. Worn out pads can be quickly and economically replaced on old shoe bodies by simply knocking out the rivets and inserting new pads.

Per Pair.. **$2.50**



Galvanized Water Pails

Packed 12 in bundle.

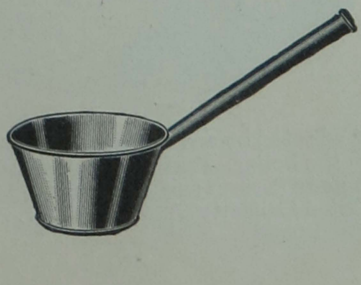
No.	Per Dozen	Trade Cap. Qts.	Actual Cap. Qts.
8	....	8	8½
10	....	10	10
12	....	12	12½
14	....	14	13 7/8
16	....	16	16½

Dimensions

No.	*Size, Inches
8	10¼x8 3/16x 8 1/8
10	10½x8 3/8x 9 1/8
12	11 1/8x8¾x10
14	11 5/8x9 x10 3/8
16	12¼x9¼x11 3/16

*Third dimension is body height.

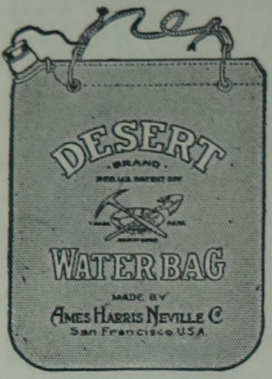
No. 2 Pieced IC Tin Water Dippers



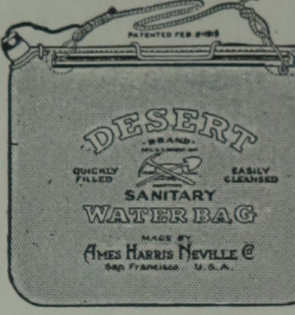
Has tin bottom.

No.	Cap. Qts.	Size In.	Approx. Ship. Wt., Lbs. per Doz.	Price per Doz.
2	**1¼**	**6½x3¾**	5	**....**

Desert Brand Water Bags


DESERT
BRAND
WATER BAG
MADE BY
Ames Harris Neville Co
San Francisco U.S.A.

Regular Closed Top Style


DESERT
BRAND
QUICKLY FILLED
EASILY CLEANSED
SANITARY
WATER BAG
MADE BY
Ames Harris Neville Co
San Francisco U.S.A.

Sanitary Open Top Style

A portable, durable water cooler. No ice is required.

Bag may be filled with water of any temperature. Warm water will reduce rapidly to a low degree by a natural action of refrigeration and remain cool and palatable for several days. Cooled by the air, the warm properties are drawn to the outer surface and evaporate.

Made of selected imported flax fabric.

Regular Closed Top Style

Capacity......gallons	1	2	3	5
Per Dozen...........	**$5.30**	**6.80**	**8.55**	**10.30**
Size...........inches	10x11½	12¾x15½	11½x22	15½x23
Weight per Dozen.lbs.	6	9	11	14

Sanitary Open Top Style

This bag is easily cleaned and purified. Strong links engage the ends of rope sling. Top can be closed securely after bag is filled. Spout permits pouring with bag tilted at low angle. Made of pressed and drawn non-rust aluminum.

Capacity......gallons	1	2	3	5
Per Dozen...........	**$6.00**	**7.90**	**9.20**	**12.40**
Size...........inches	11½x10	15½x12¾	11½x22	15½x23
Weight per Dozen.lbs.	8	11	13	17

U.S.G. Mexican Boiler Graphite

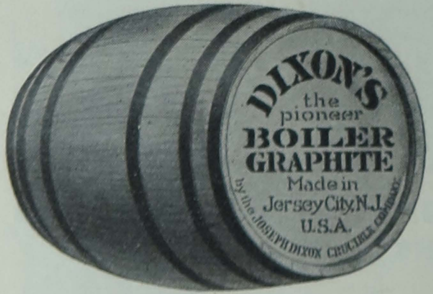
The United States Graphite Co
Mexican Boiler Graphite
Saginaw, Mich. U.S.A.

A pure form of natural graphite carbon; due to careful methods of grading and preparing, it runs uniform in quality. It does not deteriorate with age.

This graphite breaks down old, hard scale and prevents further hard formation—works mechanically, not chemically, and does not harm the boiler. It does not cause foaming and cannot be carried over with steam. A sure, safe, thorough and economical scale remedy.

Price, 100-pound Kegs....................	per pound	**$.14**
" 400 " Barrels..................	"	**.10**

Dixon's Pioneer Boiler Graphite


DIXON'S
the pioneer
BOILER GRAPHITE
Made in Jersey City, N.J. U.S.A.
by the Joseph Dixon Crucible Company

Feeding a small quantity of Boiler Graphite into boilers every day will prevent scale from burning fast to the shell and tubes.

The action of graphite is not chemical, nor does it attack metal, as is often the case with strong compounds; neither is it affected by any acids in the water or by the heat generated in the boiler. Particles of graphite simply work through the minute fissures existing in the old scale.

Drum Capacity...................lbs.	50	100	200	400
Per Pound.........................	**$.17**	**.16**	**.15**	**.14**

Dixon's Ticonderoga Flake Lubricating Graphite

5 lbs.
DIXON'S
Flake Graphite
Joseph Dixon Crucible Co

Furnished in particle size No. 1 in large, unctuous, lustrous flakes, or in particle size No. 2 in finely, subdivided, powdered flakes.

Specify No. 1 or 2 when ordering.

Used by power plant engineers and others for lubrication and coating gaskets, packing, etc., and for miscellaneous uses.

The 25-pound quantity furnished in buckets, 50-pound quantity in drums, all other sizes in cans.

No..........................	632	633	634	644	645
Per Pound....................	**$.45**	**.40**	**.37½**	**.35**	**.33**
Size Container.............lbs.	1	5	10	25	50
No. Per Case................	36	10	5	...	...

In larger containers, prices upon application.

No. 635 Dixon's Minute Flake Graphite

DIXON'S
GRAPHITE No. 635

A special minutely subdivided powdered flake graphite adapted for lubricating mechanisms having very close fitting bearing surfaces.

Excels in controlled purity and uniformity.

The 25-pound quantity furnished in buckets, 50-pound quantity in drums, all other sizes in cans.

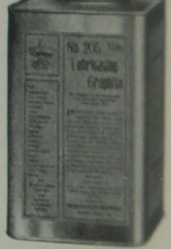
Size Container...............lbs.	1	5	10	25	50
No. 635...............per pound	**$.75**	**.65**	**.65**	**.60**	**.60**
No. per Case....................	36	10	5	...	...

In larger containers, prices upon application.

No. 205 U. S. G. Lubricating Graphite

An air floated powder of impalpable fineness; soft, adhesive and gritless. Much more adhesive than flake graphite and does not rub off. Because of its susceptibility to finer pulverization it is ground to a powder whose minute particles are capable of entering even the pores of the bearing metal.

When properly mixed with oil it can be fed through a lubricator.


No. 205
Lubricating Graphite

Size of Container Pounds	Style of Container	No. of Cans in Case	Each	Per Pound
1	Screw Top Can	36	**$.35**	...
5	Screw Top Can	12	**1.50**	...
10	Screw Top Can	6	**2.85**	...
25	Screw Top Can	2	**6.75**	...
100	Keg	..	....	**$.23**
350	Barrel	..	....	**.20**

Toledo Black Sulphur Base Thread Cutting Oil

NET CONTENTS
ONE GALLON
"TOLEDO"
TRADE-MARK
REGISTERED
T
BLACK SULPHUR BASE
THREAD CUTTING OIL
CAUTION
THE TOLEDO PIPE THREADING MACHINE CO.
TOLEDO, O. U.S.A.

A high grade thread-cutting oil.

Will not turn rancid. Assures smooth, clean threads, tight joints and increased die service.

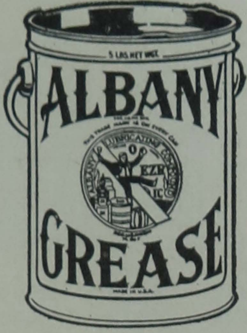
This oil is especially good either for hand tools or power machines.

Sold in 1 gallon red and black lithographed, trademarked cans or 5 gallon sealed pails.

Per Gallon...........	**$1.00**

Albany Grease

For Temperature Lubrication



Manufactured from pure tallow. This grease is sensitive to temperature changes and has sufficient body to retain its firm consistency under any condition of room temperature, but when need of lubricant in the bearing causes friction and the temperature rises, the grease in the cup melts and feeds an amount just sufficient to maintain perfect lubrication.

Hard Nos.: XXX or XX for 200°; X for 175°. Medium Nos.: 3 for 150°; 2 for 125°. Soft Nos.: 1 or 0 for 100°.

Albany grease does not deteriorate or spoil in storage.

Every can is lithographed in yellow with a black design, and has the consistency number embossed on the cover and bottom.

Size Package	Per Pound	Size Package	Per Pound	Size Package	Per Pound
1-Lb. Can	$.45	25-Lb. Cont.	$.28	200-Lb. Drum	$.17½
5-Lb. Can	.32	50-Lb. Cont.	.27	400-Lb. Drum	.16½
10-Lb. Can	.30	100-Lb. Drum	.18½	....	.....

Mine Car Grease

Available in 5, 10, and 25 pound cans.

Unless otherwise specified No. 1 cup grease will be supplied.

Prices upon application.

Lubricating Oils

Cylinder Oil

A high grade heavy-bodied steam cylinder oil for the lubrication of large and small engines operating under ordinary conditions.

Heavy Air Compressor Oil

A high-grade, medium bodied pure mineral oil especially designed for 2-stage air compressor cylinders that are not subject to severe duty and when maximum air pressure does not exceed 125 pounds per square inch.

Light Air Compressor Oil

A high-grade, light bodied pure mineral oil suitable for cylinder lubrication of small air compressors and for medium single-stage air compressors not subject to heavy duty and high discharge temperatures.

Gas Engine Oil

An oil especially prepared for the lubrication of cylinders of stationary gas engines, also for tractor engine using gasoline for fuel.

Red Engine Oil

A pure mineral engine oil of medium body suitable for general lubrication of bearings of engines, generators, motors, shafting and other machinery of moderate speeds exposed to comfortable room surrounding temperature.

Machine Castor Oil

Prices upon application.

Dixon's L.&P. Lubricating and Penetrating Graphited Oil

DIXON'S
L&P
GRAPHITE
OIL

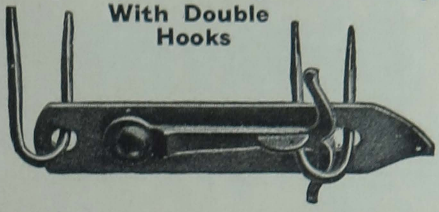
For general industrial, household and automotive uses; a rust solvent and preventive.

3-Oz. Squirt Can, 36 in Case	per can	$.30
1-Pt. Squirt Can, 12 in Case	per can	.75
1-Gal. Can, 6 in Case	per can	3.50
5-Gal. Steel Drum, Agitator Type	per gal.	1.80

Also in large containers.

Wrought Steel Hasps and Staples

With Double Hooks

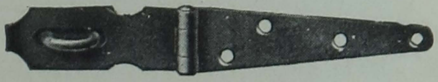


Packed 12 in a box.

Length Inches Strap	Length Inches Staples	Weight Pounds per Dozen	Price, per Dozen No. 932 Bright Steel	Price, per Dozen No. 982J Japanned	Price, per Dozen No. 982R Galvanized
5	2	2	....	....	....
6	2¼	3	....	....	....
7	2½	3¾	....	....	....
8	2½	4	....	....	....
10	2½	7½	....	....	....

No. 912 Hinge Hasps

Wrought Steel—Red Tipped

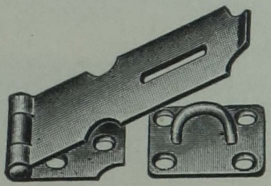


Size 6 inches and smaller packed 12 in a box; larger sizes packed 6 in a box.

Without screws.

Length Strap Inches	Bright Steel, per Single Dozen	No. of Screw Holes	Size of Screws	Dozens in Case	Weight, Lbs. Per Dozen	Weight, Lbs. Case
3	.....	7	¾x 6	25	2	52
4½	.....	8	¾x 6	25	2⅝	69
6	.....	8	1 x 9	10	5⅛	53
8	.....	8	1 x10	5	8½	42
10	.....	8	1¼x10	3	14½	41
12	.....	8	1¼x12	2	19½	40

Wrought Safety Basket Hasps



When the hasp is closed and locked, the screws are covered and they cannot be removed.

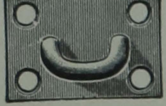
Packed 12 in a box with screws; 100 dozen in a case; case weight, No. 346, 115 pounds; No. 1862, 122 pounds.

Length, 2½ inches. Width at joint, ⅞ inches.

No. **346**, Steel, with Screws	per dozen	....
No. **1862**, Brass, with Screws	per dozen	....

No. 913 Wrought Hinge Hasp Staples

Plain Steel



Packed, 2¾x2-inch size, two dozen in a box; other sizes, three dozen in a box.

For Hasps Size Inches	Per Doz.	Projection of Staples Inches	Size of Plate Inches	Average Wt. Lbs. per Doz. Pieces
3	....	¾	1½x1⅛	¾
4½	....	¾	1½x1⅛	¾
6	....	¾	2 x1¼	1⅛
8	....	¾	2 x1½	1½
10	....	15/16	2¾x2	3½
12	....	15/16	2¾x2	3½

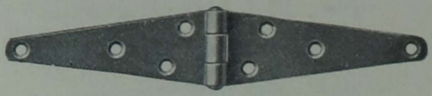
No. 900 Red Tipped Light Strap Hinges

Plain Steel

Size Length of Each Leaf, In.	Per Dozen Pairs Without Screws	Width of Joint Inches	Size of Screw	No. of Screw Holes	Dozen Pairs in a Case	Av. Wt., Lbs. Per Doz. Pairs	Case
2	.....	1	5/8 x 5	6	25	1 3/8	35
3	.....	1 3/32	3/4 x 6	6	25	2 3/8	60
4	.....	1 3/16	3/4 x 7	6	20	4	80
5	.....	1 11/32	1 x 8	8	10	6	61
6	.....	1 9/16	1 x 9	8	6	9	55
8	.....	1 7/8	1 x10	8	3	15	47
10	.....	2 3/32	1 1/4x10	8	3	22	70
12	.....	2 3/4	1 1/4x12	8	2	38	78

No. 902 Red Tipped Heavy Strap Hinges

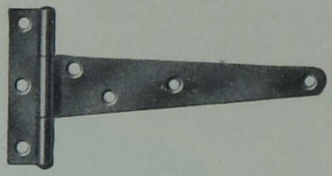
Plain Steel



Size Length of Each Leaf, In.	Per Dozen Pairs Without Screws	Width of Joint Inches	Size of Screw No.	No. of Screw Holes	Doz. Pairs in a Case	Av. Wt., Lbs. Per Doz. Pairs	Case
4	.....	1 9/16	1 x 9	6	10	6	61
5	.....	1 3/4	1 x10	8	5	9 1/2	51
6	.....	2 5/8	1 1/4x11	8	4	19	76
8	.....	3 3/16	1 1/4x12	8	2	32 3/4	70
10	.....	3 11/16	1 1/2x14	8	1/2	52 1/4	27
12	.....	4 9/16	1 1/2x16	10	1/2	81 1/2	42
14	.....	4 3/4	1 1/2x16	10	....	86 1/2	..

No. 904 Red Tipped Light T Hinges

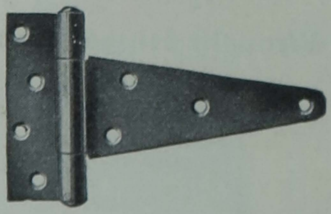
Plain Steel



Lgth. Strap In.	Per Dozen Pairs Without Screws	Width of Strap at Joint In.	Lgth. Joint In.	Size Screw No.	No. Screw Holes	Doz. Pairs in Case	Av. Wt., Lbs. Doz. Prs.	Case
2	.....	7/8	2	5/8 x 5	6	25	1 1/2	39
3	.....	1	2 3/8	3/4 x 6	6	25	2 3/4	68
4	.....	1 1/16	2 5/8	3/4 x 7	6	15	3 1/2	53
5	.....	1 3/16	3	1 x 8	7	10	4 7/8	50
6	.....	1 1/4	3 1/4	1 x 8	7	10	6 1/4	65
8	.....	1 7/16	4	1 x 9	7	5	9 3/8	49
10	.....	1 9/16	4 1/2	1 1/4x10	8	3	14	43
12	.....	1 15/16	4 3/4	1 1/4x11	8	2	20 1/2	45

No. 908 Red Tipped Extra Heavy T Hinges

Plain Steel



Lgth. Strap In.	Per Dozen Pairs Without Screws	Width of Strap at Joint In.	Length Joint Inches	Size of Screw No.	No. of Screw Holes	Dozen Pairs in a Case	Av. Wt., Lbs. Per Doz. Pairs	Case
4	.....	1 5/8	3 1/2	1 x 9	6	10	7 3/4	78
5	.....	2 1/8	3 7/8	1 x10	8	5	13 1/2	70
6	.....	2 3/8	4 1/2	1 1/4x11	8	4	21 1/4	87
8	.....	2 7/8	5 1/2	1 1/2x12	9	2	37	76
10	.....	3 3/4	7	1 1/2x14	9	1/2	58	30
12	.....	4 1/16	7 3/4	1 1/2x16	10	1/2	78	40
14	.....	4 1/16	7 3/4	1 1/2x16	10	....	82	..
16	.....	4 3/16	7 3/4	1 1/2x16	11	....	88	..

Yale Cast Bronze Padlocks

YALE & TOWNE MFG. CO.
YALE
853
YALE

Size, 2 inches. Four lever-tumblers. Two keys; 144 key changes.

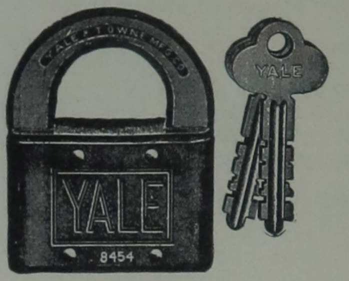
All parts, inside and out, are of non-corroding material to resist the action of the weather. They are assembled and encased in a heavy bronze block which is set securely into case and riveted thereto.

Packed one in a box, six in a carton.

No.	Each	Case Finish	Shackle
853	**$2.50**	Fine Wheel Fin.	Bronze, Wheel Fin.
854	**2.75**	Fine Wheel Fin.	Steel, Casehardened.

Locks furnished with chain or dust guard at extra charge.

No. 8454 Yale Seamless Steel Padlocks



Size, 2 inches. Four lever-tumblers. Two keys; 144 key changes.

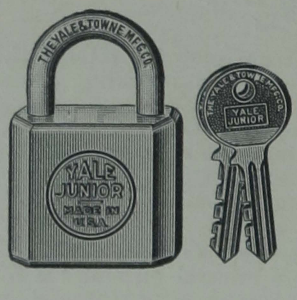
Working parts are assembled and encased in a heavy bronze block, which is set securely into case and riveted thereto.

Packed 6 in a box.

No.	Each	Case Finish	Shackle
8454	**$1.10**	Steel, Bower-barffed	Steel, Bower-barffed

Can be furnished with chain at an extra charge.

No. 240 Yale Padlocks


THE YALE & TOWNE MFG. CO.
YALE JUNIOR
MADE IN U.S.A.
THE YALE & TOWNE MFG. CO.
YALE JUNIOR

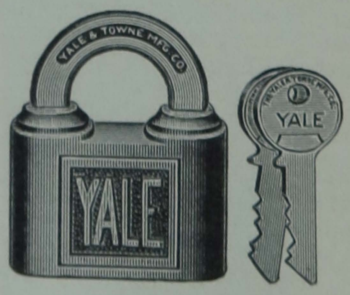
This 1 1/2-inch lock has a die-cast case, mahogany lacquered.
Secure warded.
Shackle is of steel, cadmium-plated.
Size shackle: 1/4 inch in diameter; 13/16-inch clearance.
Furnished with 2 No. 240 keys, 18 key changes.
Cannot be master-keyed.
Packed 6 in a box; weight per dozen without chain 4 pounds.

Also packed 300 in a case; weight 110 pounds.

No. **240**..................................per dozen **$3.34**

No. **240½**, with 8 Inches of 41S Chain......per dozen **5.00**

No. 805F Yale Cast Iron Padlocks



No. 805-F padlock, 2 inch, Bower Barffed Case, four pin tumblers, buffed bronze shackle.

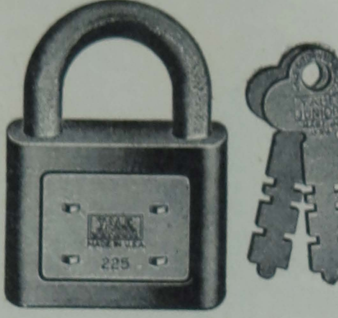
It has two flat steel keys; with 144 key changes.

Can be furnished with chain at an extra charge.

Packed 6 in a box.

Each.. **$1.10**

Yale Cast Iron Padlocks



Warded mechanism.

Two keys; 6 key changes.

The 1½-inch locks are packed 12 in a box; 2-inch are packed 6 in a box.

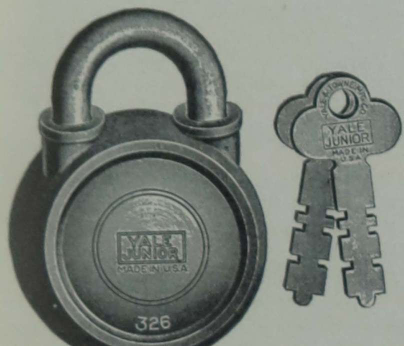
Locks can be furnished with chain at an extra charge.

Case finish, bower-barffed, panels cadmium plated.

Steel shackle, cadmium plated.

No.	223	225
Per Dozen	$3.00	3.00
Size, inches	1½	2

No. 326 Yale Malleable Iron Padlocks



Size, 2¼ inches.

Warded mechanism.

Case Malleable iron, bower-barffed. Discs, steel case-hardened, cadmium-plated.

Shackle, cadmium-plated steel.

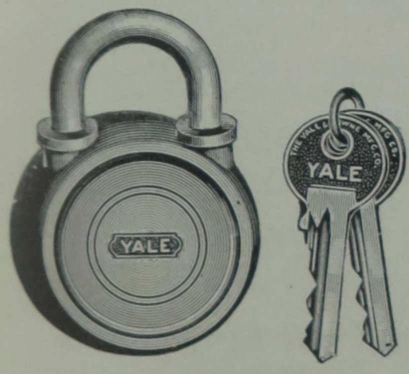
Has 2 keys; 6 key changes.

Chain can be furnished at extra charge.

Packed 6 in a box.

No. 326 ....each **$.55**

No. 726 Yale Malleable Iron Padlocks



Size, 2¼ inches.

Four pin-tumblers.

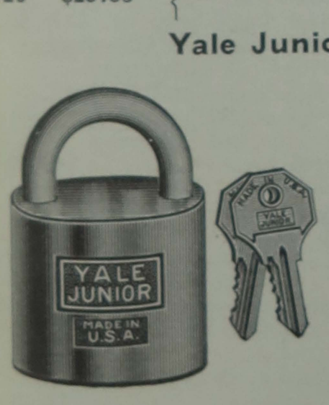
Two keys; 3000 key changes.

Steel discs, case-hardened; finished in chromium plate.

Packed 6 in a box.

No.	Dozen	Case Finish	Shackle
726	$23.35	Bower-Barffed	Steel, Case-Hardened and Cadmium-Plated

Yale Junior Padlocks



Die-cast metal case; green lacquer finish.

Five disc-tumblers.

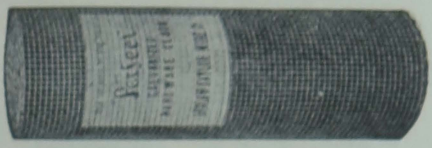
Key changes, 200. Two No. 9298A keys.

Cadmium plated steel shackle.

Packed 6 in a box.

No.	604	606
Per Dozen	$6.00	9.00
Size, inches	1¾	2
Wt. per Dozen, pounds	6	8⅝

Galvanized Hardware Cloth

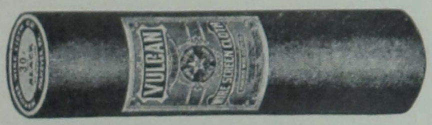


Galvanized cloth can be furnished galvanized after it is woven in all meshes up to and including 8 mesh, and in all widths up to and including 48-inch. Anything finer than 8 mesh must be woven from galvanized wire.

Width	Weight, Pounds, per 100 Lineal Feet—No. Mesh						
In.	2	3	4	5	6	7	8
24	58	56	54	50	50	51	48
30	72	70	67	62	62	68	60
36	87	84	81	75	75	77	72
42	101	98	94	87	87	90	84
48	116	112	108	100	100	105	96

Prices quoted on receipt of specifications.

Vulcan Black Wire Fly Screen Cloth



Vulcan is black painted; it has a double selvage and two wires on each selvage.

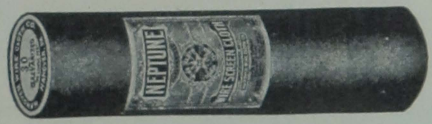
This grade of cloth is given a heavy coating of long oil black varnish, baked to a hard, yet elastic and durable finish, with a substantial bead.

The material used in Vulcan Wire Cloth is unusually stiff and the coating extremely flexible.

This cloth is furnished in all widths, in even inches, from 18 to 48 inches.

Price, **12** Mesh....................per 100 square feet ....
" **14** " .... " 100 " " ....
" **16** " .... " 100 " " ....

Neptune Bright Galvanized Wire Fly Screen Cloth



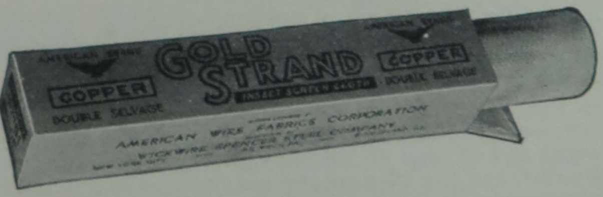
Neptune is made of bright galvanized zinc coated steel wire; it has a double selvage and two wires on each selvage.

More durable than painted cloth.

This cloth is furnished in all widths, in even inches, from 18 to 72 inches.

Price, **12** Mesh....................per 100 square feet ....
" **14** " .... " 100 " " ....
" **16** " .... " 100 " " ....
" **18** " .... " 100 " " ....

American Gold Strand Copper Screen Wire Cloth



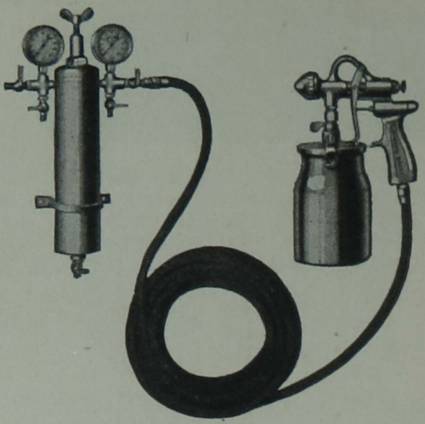
This cloth is made from hard drawn pure (99.8 per cent) copper wire, true in gauge and mesh and squarely woven.

Has bright copper finish, lacquered.

Standard widths, 18 to 48 inches, inclusive. Regular 14, 16 and 18 mesh.

Price, **14** Mesh....................per 100 square feet ....
Price, **16** Mesh....................per 100 square feet ....
Price, **18** Mesh....................per 100 square feet ....

Imperial Spray Painting Outfits



No. 73-C

These outfits are made up for automobile paint shops, garage, automobile dealers, etc., who already have a source of air supply.

No. 73-C Outfit

The No. 73-C outfit consists of the following:

One No. 67-C Hi-Duty Spray Gun with 1 quart cup assembly, wrench and cleaning brush.

One 25-foot length 5/16-inch corrugated heavy duty air hose.

One No. 69-C Hi-Duty water and oil separator and regulating set.

No. **73**-C Outfit Complete....................each **$60.85**

No. 78-C Outfit

This outfit is similar to the No. 73-C and consists of the following:

One No. 77-C Junior Spray Gun with 24-ounce cup assembly, wrench and cleaning brush.

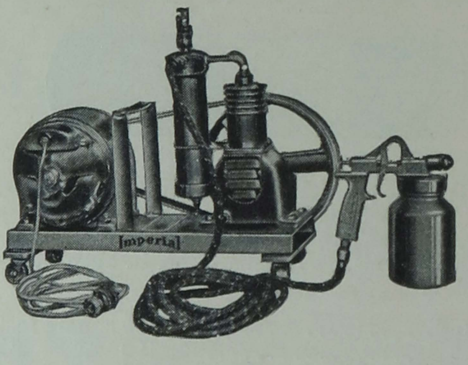
One 25-foot length 1/4-inch corrugated heavy duty air hose with connections.

One No. 89-C water and oil separator and regulating set.

No. **78**-C Outfit Complete....................each **$38.25**

Imperial Paint Spray Equipment

No. 21-CPA Outfit—1/4 H.P. Portable



A complete, compact and efficient outfit for small repair shops, office buildings, stores, home and farm owners and for painters for emergency work. All ready for work when attached to a light socket and will do excellent spray painting at a price so low that a few days' use will more than pay for the outfit. Maximum pressure 30 pounds.

The pressure cup type spray gun handles paints, varnishes and lacquers, and gives a fast and perfectly atomized flat stream of material.

The No. 21-CPA Outfit consists of the following:

One No. 1-CPA 1/4 h.p. portable electric motor-driven air cooled single-stage compressor with pulsation chamber, and water and oil trap with drain valve. Has pop-off safety relief valve, and felt silencer and air cleaning pad in intake of compressor. Has casters and a carrying handle, also a 10-foot length of electric extension cord. Operates on a.c. single phase, 60-cycle, 110 volts.

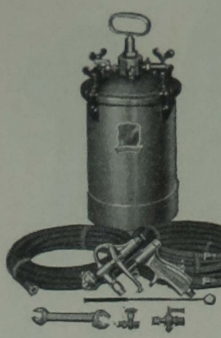
One No. 85-C Imperial pressure cup type paint spray gun with 1-quart aluminum cup, wrench and cleaning brush.

One 15-foot length 1/4-inch corrugated heavy duty air hose with connections.

No. **21**-CPA Outfit Complete..................each **$53.80**

Other types of motors at slight additional cost.

No. 81-C Imperial Paint Spray Outfits



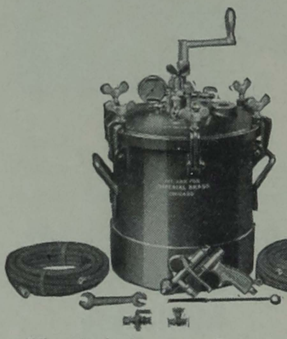
For use in factories and garages, and by painting contractors, etc., where air pressure is already available.

No. **81**-C Outfit Complete ....each **$65.55**

Outfit consists of the following:

1	No. 65-C Imperial Hi-Duty Spray Gun for Flat or Round Spray with Wrench and Cleaning Brush..................	**$24.85**
1	No. 71-C 2-Gallon Material Pressure Feed Container, with Pressure Regulator, Safety Valve, Relief Valve, and Air and Fluid Shut-off Cocks..........................	22.50
2	25-Foot Lengths 5/16-Inch Corrugated Heavy Duty Air Hose with Connections......................	9.00
1	25-Foot Length 1/2-Inch Fluid Hose with Connections..................................	6.70
1	No. 95-C Air Regulating Valve..................	1.50
1	No. 97-C Fluid Cut-off Cock....................	1.00

No. 82-C Imperial Paint Spray Outfits



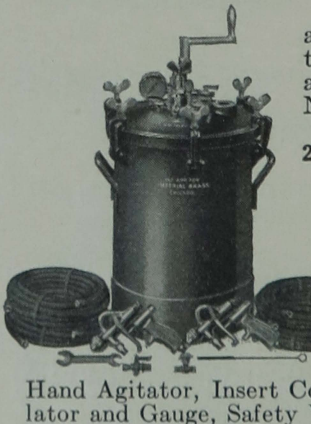
For use in factories, garages, and by painting contractors, etc., where air pressure is already available.

No. **82**-C Outfit Com. .ea. **$93.00**

Outfit consists of following:

1	No. 65-C Hi-Duty Spray Gun for Flat or Round Spray with Wrench and Cleaning Brush........	**$24.85**
1	No. 72-C 5-Gallon Galvanized Material Pressure Feed Container with Hand Agitator, Insert Container, Pressure Regulator and Gauge, Safety Valve, Relief Valve, and Air and Fluid Cut-off Cocks......................	48.00
1	25-Foot Length 1/2-Inch Corrugated Heavy Duty Air Hose with Connections......................	6.45
1	25-Foot Length 5/16-Inch Corrugated Heavy Duty Air Hose with Connections......................	4.50
1	25-Foot Length 1/2-Inch Fluid Hose with Connections..................................	6.70
1	No. 95-C Air Regulating Valve..................	1.50
1	No. 97-C Fluid Cut-off Cock....................	1.00

No. 83-C Imperial Paint Spray Outfits



For use in factories and garages, and by painting contractors, etc., where air pressure is already available.

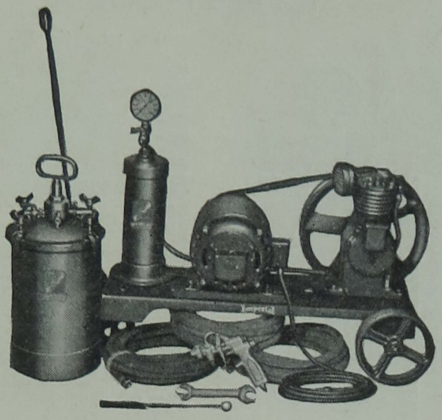
No. **83**-C Outfit Com.ea. **$135.80**

Outfit consists of following:

2	No. 65-C Hi-Duty Spray Guns for Flat or Round Spray, Each with Wrench and Cleaning Brush.................	**$49.70**
1	No. 72-C 10-Gallon Galvanized Material Pressure Feed Container with Hand Agitator, Insert Container, Pressure Regulator and Gauge, Safety Valve, Relief Valve, and Fluid Cut-off Cocks............................	49.50
1	50-Foot Length 1/2-Inch Corrugated Heavy Duty Air Hose with Connections......................	11.70
2	25-Foot Length 5/16-Inch Corrugated Heavy Duty Air Hose with Connections......................	9.00
2	25-Ft. Lgth. 1/2-In. Fluid Hose with Connections.	13.40
1	No. 95-C Air Regulating Valve..................	1.50
1	No. 97-C Fluid Cut-off Cock....................	1.00

Imperial Paint Spray Equipment

No. 22-CPF Outfit—½ H. P. Portable



A compact, easy-to-move and easy-to-use outfit for the small painting contractor, decorator, builder, steamfitter or plumber. It can be used by the automobile dealer for painting and touch-up work, also in garages, fender and body shops, radiator shops, sign painting shops, for refinishing furniture and for small maintenance work.

No. **22-CPF** Outfit Complete..................each **$165.89**

Outfit consists of the following:

1	No. 2-CPF ½ H.P. Portable Electric Motor-Driven Air Compressor with Pulsation Chamber, Water and Oil Trap with Drain Valve, and Felt Silencer and Air Cleaner in Intake of Compressor. Complete with Safety Check Valve and Air Pressure Gauge, Which Shows Exact Air Pressure at All Times. Three Wheel Hand Truck with Swivel Front Wheel and 10-Foot Length of Electric Extension Cord (AC-1 Phase, 60-Cycle, 110 or 220-Volt)..	**$115.00**
1	No. 75-C Imperial Paint Spray Gun for Flat or Round Spray, with Wrench and Cleaning Brush..	**14.85**
1	No. 71-C 2-Gallon Material Pressure Feed Container with Regulator..........................	**22.50**
1	20-Foot Length ½-Inch Corrugated Heavy Duty Air Hose with Connections......................	**5.40**
1	12-Foot Length ¼-Inch Corrugated Heavy Duty Air Hose with Connections......................	**2.36**
1	12-Foot Length ⅜-Inch Fluid Hose with Connections......................................	**3.28**
1	No. 97-C Fluid Cut-off Cock..............................	**1.50**
1	No. 95-C Air Adjusting Valve..............................	**1.00**

If above outfit is wanted with different type compressor motor or gas engine drive, order by the following outfit numbers:

No.	Motor Specifications	Complete Outfit Each	Compressor No.	Unit Only Each
22-CPH	AC-1 Phase, 25 Cycle, 110 or 220-Volt.......	**$175.09**	2-CPH	**$124.20**
22-CPC	AC-3 Phase, 60 Cycle, 220-Volt............	**165.89**	2-CPC	**115.00**
22-CPE	AC-3 Phase, 25 Cycle, 220-Volt............	**165.89**	2-CPE	**115.00**
22-CPD	Direct Current, 110-Volt	**165.89**	2-CPD	**115.00**
22-CPG	¾ H. P. Gasoline Engine Drive...............	**220.89**	2-CPG	**170.00**

Specifications

Motor, ½ h. p. Displacement, 3.7 cubic feet per minute; bore, 2¼ inches; stroke, 2 inches. Maximum pressure, 50 pounds. Filter retort tank. Length, 30 inches; width, 16 inches; height, 26 inches.

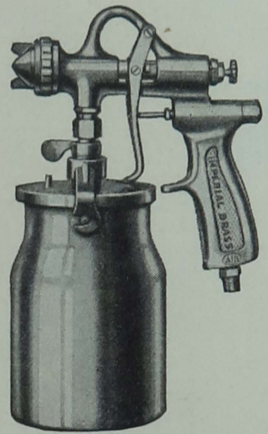
Shipping weight, EM 165 pounds; GE 185 pounds.

Note: When ordering electric motor driven compressors be very sure to give the correct specifications. If in doubt about the kind of current used, get the information from electric company. State voltage, whether A. C. or D. C., and if A. C., give the frequency or number of cycles, and the phase (either 1, 2 or 3).

If different type electric motors are required than listed above, write for quotations.

Imperial Hi-Duty Spray Guns

For Flat or Round Spray



This spray gun can be used for all classes of painting and will atomize paint materials at low air pressures. It produces an even flow of material, perfectly atomized and free from streaks, thereby assuring a uniform wet coat so necessary in securing a good finish.

Two air caps are furnished, one for a fan or flat spray and one for a round spray.

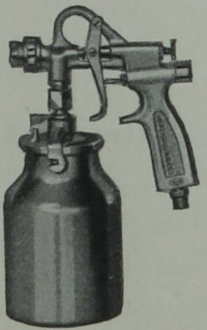
The fluid needle is made of stainless steel and is provided with a positive adjustment which gives the operator complete control of the material at all times.

Complete air valve assembly can be removed as a single unit. Gun is easy to dismantle for cleaning. Where quick changes of material or variety of colors are used a suction feed cup assembly is recommended. Requires only a few seconds to clean the fluid passageway of gun, remove the cup and attach another.

No. **67-C** Hi-Duty Spray Gun for Flat or Round Spray with 1-Quart Suction Feed Cup Assembly, Wrench and Cleaning Brush..................each	**$28.85**
No. **65-C** Hi-Duty Spray Gun for Flat or Round Spray, without Suction Feed Cup Assembly..each	**24.85**
No. **66-C** 1-Quart Suction Feed Cup Assembly Only (Consists of Nos. 109-C and 110-C)...........each	**4.00**
No. **109-C** Suction Feed Cover Assembly Only..each	**2.65**
No. **108-C** Mason Glass Jar Assembly.....Complete	**2.00**
No. **110-C** 1-Quart Cup Only..................each	**1.35**
No. **79-C** Plain Air Tight Cover Only for Cup..each	**.25**

Imperial Junior Spray Guns

For Flat or Round Spray



This model is used for automobile painting, finishing work, touch-up work, painting and shading of furniture, toys, novelties, and for all other work where high speed is not essential or the air supply limited.

The flow of material, perfectly atomized and free from streaks, assures a uniform wet coat so necessary in securing a good finish.

Produces an adjustable spray stream and atomizes paint materials at low air pressures. Two spray heads are furnished with each gun—one for flat spray and one for round spray.

The pistol grip handle, 2-finger trigger, stainless steel fluid needle, paint adjuster, and the air inlet at bottom of handle are all features in the Junior Spray Gun. Gun can be used for long periods of time without tiring hand.

Where quick changes of material or a variety of colors are used, the use of a suction feed cup assembly is recommended. Gun can be cleaned and another cup attached in a few seconds. When a number of colors are used, it is advisable to have several extra cups, No. 112-C, which are furnished with airtight plain covers.

No. **77-C** Junior Spray Gun for Flat or Round Spray with 24-Ounce No. 76-C Suction Feed Cup Assembly, Wrench and Cleaning Brush.............each	**$18.35**
No. **75-C** Junior Spray Gun for Flat or Round Spray without Suction Feed Cup Assembly.........each	**14.85**
No. **76-C** 24-Ounce Suction Feed Cup Assembly Only (Consists of Nos. 111-C and 112-C)..........each	**3.50**
No. **108-C** Mason Glass Jar Assembly Complete....	**2.00**
No. **111-C** Suction Feed Cover Assembly Only..each	**2.40**
No. **112-C** 24-Ounce Cup Only................each	**1.10**
No. **115-C** Plain Air Tight Cover Only for Cup.each	**.25**

No. 85-C Imperial Pressure Cup Type Spray Guns

Recommended for general painting in the home, in private garages, stores and for painters. Handles paints, varnishes and lacquers, and will operate on any ¼ h.p. compressor unit with displacement not less than 2 cubic feet of air per minute.

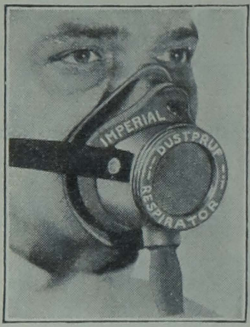
Air pressure is maintained above material in cup when gun is in operation, assuring a constant and uniform flow to the spray gun nozzle. This permits the operator to use heavier materials and obtain a faster and better atomized stream.

An automatic relief valve releases the air if a pressure over 35 pounds is used. Gun has 2-finger trigger, paint adjuster and a standard ¼-inch pipe thread air connection at base of handle. Spun aluminum cup holds 1 quart. Furnished with either flat or round spray nozzle.

No. **85-C** Pressure Type Spray Gun Complete with Cup, Wrench and Cleaning Brush............each **$12.85**

No. **86-C** Extra 1-Quart Cup Only.............each **1.35**

No. 100-C Imperial Respirators



The respirator prevents the inhaling of spray dust and will comfortably fit the contour of the operator's face without interfering with his vision.

The light aluminum shell has a rubber padding that rests against the face and the air that the operator breathes passes through a chemically treated filter pad which absorbs the spray dust.

The filter pad can be easily replaced and the adjustable elastic band holds the respirator in place. Complete with 12 filter pads.

No. **100-C**....................................each **$2.00**

No. 110-C Imperial Extra Feed Cups

Where frequent color changes are required it is very convenient to have additional feed cups. Air-tight covers can also be furnished.

Capacity, 1 quart. For No. 67-C Spray Gun.

No. **110-C**.......................each **$1.35**

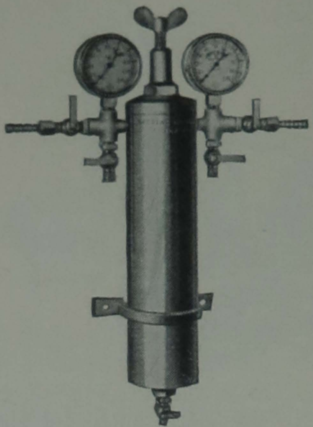
No. 118-C Imperial Aluminum Funnels

Heavy aluminum, especially designed for filling and straining material used in material pressure feed containers. To protect the brass screen a metal ring is securely soldered to it. Easily cleaned. Capacity above screen, 1 gallon.

No. **118-C**...................................each **$4.00**

Imperial Water and Oil Separator and Regulating Sets

No. 69-C Hi-Duty



No. 69-C

To obtain a perfectly finished job, the oil and moisture which is present in air lines must be removed so that the air will be clean and dry. The No. 69-C Separator has a large capacity and will positively remove all water and oil from the air, leaving it in perfect condition for spray finishing. No felt, waste packing or baffle plates are used, and no clogging can occur to cause a drop in the air line pressure.

The regulator will hold the air pressure at the point which it is set without variation, which assures an even pressure at the air nozzle resulting in a uniform coated surface. The air inlet is at the rear of the separator.

Two gauges are furnished, one for indicating the main air line pressure and the other for indicating the working pressure. Four air outlets make it possible to use two spray guns while the other two outlets can be used to supply air for air duster and other appliances. Each outlet is fitted with a shut-off valve. Bracket is furnished for mounting separator to wall.

The only attention required is the periodic opening of the drain cock at bottom of separator for draining off the accumulated oil and moisture. Chromium plated finish.

No. **69-C** Hi-Duty...........................each **$27.50**

No. 68-C Water and Oil Separators

Similar to the No. 69-C except that it does not have the two gauges and regulator, and the air intake is at the top instead of at the rear of the separator.

Chromium plate finish.

No. **68-C**......................................each **$13.75**

No. 89-C Separator and Regulating Sets

The No. 89-C has the same working features as the No. 69-C Hi-Duty but is smaller.

Furnished complete with regulator and gauge. Pressure can be regulated where the best atomization of spray is obtained and maintained without variation. The outlets make it possible to use two spray guns at the same time. Oil and moisture are drained off through the drain cock at bottom of separator. Furnished in white nickel finish.

No. **89-C** Separator and Regulating Set........each **$15.85**

No. **88-C** Separator Only for No. 89-C, less Regulator and Gauge...................................each **6.85**

No. **74-C** Regulator Complete with Gauge for No. 89-C, less Separator......................each **9.00**

No. 116-C Imperial Gravity Feed Material Containers

Constructed of heavy aluminum and has a capacity of 4 gallons.

Furnished with a heavy aluminum cover with nickel plated handle. Bottom of the container has rounded corners so that it is easily cleaned and the heavy bail handle has a retainer loop to hold the container in stationary position when attached to block and tackle hook.

Each container has a leak-proof heavy brass bib-cock with lever shut off handle.

No. **116-C**............each **$4.50**

Imperial Pressure Feed Containers

No. 71-C

No. 72-C

Convenient and efficient. Requires only one or two fillings of the container, and operator can continue without interruption until job is completed.

Made of heavy gage seamless cold drawn steel; built to withstand hard usage. The cover for the container seats on a gasket and is held in place by heavy hinged clamps which allow the cover to be removed quickly and easily. Full size opening permits easy cleaning.

Furnished with pressure regulator, safety valve, relief valve, and air and fluid cut-off cocks.

All but the 2-gallon sizes are furnished with hand agitator, paint pressure gauge and insert container. Extra insert containers with cover can be supplied, permitting quick changes of material.

All sizes are galvanized except 2-gallon size, which is cadmium plated.

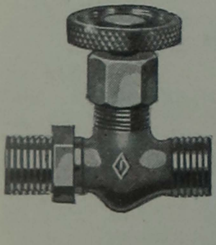
No.	71-C	72-C	72-C	72-C	72-C
Each	**$22.50**	**48.00**	**49.50**	**68.25**	**88.00**
Size.....gals.	2	5	10	15	20

No. 120-C Insert Covers

With cover. Tinned finish.

Size.....gals.	**5**	**10**	**15**	**20**
Each	**$3.50**	**4.00**	**4.50**	**8.00**

No. 95-C Imperial Air Adjusting Valves



The air adjusting valve (needle valve type) is used between the air hose and spray gun so that air adjustment may be made without stopping work. Furnished in 2 sizes—¼-inch standard pipe thread on both ends—¼-inch standard pipe thread on one end and ⅛-inch standard pipe thread on the other end.

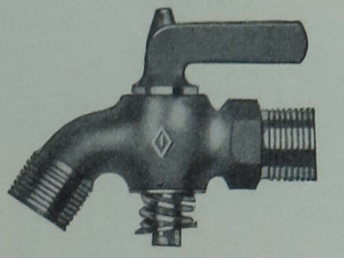
Size.....in.	¼x¼	¼x⅛
Each	**$1.50**	**1.50**

No. 97-C Imperial Fluid Cut-Off Cock

This cock is used between the fluid hose and spray gun making it possible to remove the gun without losing the fluid already in the hose or forcing it back into the container. It has ⅝"–18 male thread on one end and ⅝"–18 female thread on the other end.

No. **97-C** Fluid Cut-Off Cock....................each **$1.00**

No. 117-C Imperial Brass Bib-Cocks



Especially adapted for use on gravity feed material containers and is regularly furnished with No. 116-C Container.

Has ⅜-inch standard male pipe thread on one end and ⅝-inch—18 thread on the other end.

No. 117-C....................each **$1.50**

Imperial Spray Painting Equipment

Heavy Duty Air Hose

Imperial Corrugated Heavy Duty Air Hose was developed especially to meet the requirements of spray painting. It is made of pure gum rubber with braided fabric inserts which form a seamless hose. The corrugated black rubber cover resists wear and is impervious to paint. This hose is tested for bursting pressures far beyond those used in spray painting. It is flexible and non-collapsible.

No. 161-C ¼-Inch Inside Diameter; 17/32-Inch Outside Diameter

Item	Unit	Price
12-Foot Length with Connections	each	**$2.36**
15-Foot Length with Connections	each	**2.75**
25-Foot Length with Connections	each	**4.05**
50-Foot Length with Connections	each	**7.30**
¼-Inch Hose	per foot	**.13**
¼-Inch Air Hose Connections	per set	**.80**

No. 162-C 5/16-Inch Inside Diameter; 9/16-Inch Outside Diameter

Item	Unit	Price
12-Foot Length with Connections	each	**$2.68**
15-Foot Length with Connections	each	**3.10**
25-Foot Length with Connections	each	**4.50**
50-Foot Length with Connections	each	**8.00**
5/16-Inch Hose	per foot	**.14**
5/16-Inch Straight Connections	per set	**1.00**

No. 163-C ½-Inch Inside Diameter; 15/16-Inch Outside Diameter

Item	Unit	Price
25-Foot Length with Connections	each	**$6.45**
50-Foot Length with Connections	each	**11.70**
½-Inch Hose	per foot	**.21**
½-Inch Air Hose Connections	per set	**1.20**

Flexible Fluid Hose

Imperial Fluid Hose has a composition inner tube that is absolutely impervious to the softening action of lacquer solvents—turpentine, distillate, gasoline, naphtha, etc. Swelling, softening and similar troubles will never be encountered where Imperial Fluid Hose is used. Great strength is given by the unique Imperial method of construction which insures longest life.

No. 164-C ⅜-Inch Inside Diameter; 11/16-Inch Outside Diameter

Item	Unit	Price
12-Foot Length with Connections	each	**$3.28**
15-Foot Length with Connections	each	**3.85**
25-Foot Length with Connections	each	**5.75**
⅜-Inch Hose	per foot	**.19**
⅜-Inch Fluid Hose Connections	per set	**1.00**

No. 165-C ½-Inch Inside Diameter; ⅞-Inch Outside Diameter

Item	Unit	Price
12-Foot Length with Connections	each	**$3.84**
15-Foot Length with Connections	each	**4.50**
25-Foot Length with Connections	each	**6.70**
½-Inch Hose	per foot	**.22**
½-Inch Fluid Hose Connections	per set	**1.20**

Imperial Hose Adapters, Couplings and Connections

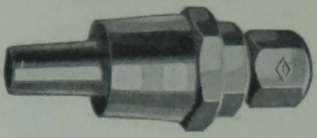
Adapters

Couplings

Cat. No.	Each	Male Thread	Female Thread
125-C	$.24	5/8″–18	3/8″
126-C	.24	5/8″–18	9/16″–20
127-C	.24	5/8″–18	1/4″
128-C	.24	9/16″–20	1/4″
129-C	.24	9/16″–18	1/4″
130-C	.24	9/16″–20	5/8″–18
131-C	.24	3/8″	5/8″–18
132-C	.24	1/4″	9/16″–20
133-C	.24	9/16″–20	3/8″
134-C	.24	1/4″	5/8″–18
135-C	.24	1/4″	3/8″

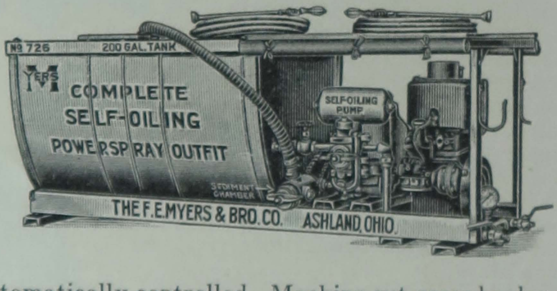
Cat. No.	Each	Male Thread	Female Thread
140-C	$.24	1/4″	1/4″
141-C	.24	5/8″–18	5/8″–18
142-C	.24	9/16″–20	5/8″–18
143-C	.24	3/8″	5/8″–18
144-C	.24	1/4″	9/16″–20
145-C	.24	1/4″	9/16″–18
146-C	.24	9/16″–20	9/16″–20
147-C	.24	3/8″	3/8″
.....	...	......	......
.....	...	......	......
.....	...	......	......

Connections



Cat. No.	Each	Hose Size In.	Female Thread	To Fit Hose Diameter, Inches Inside	
				Inside	Outside
150-C	$.40	1/4 Air	1/4″	7/32 to 5/16	33/64 to 9/16
151-C	.50	5/16 Air	1/4″	1/4 to 3/8	9/16 to 5/8
152-C	.60	1/2 Air	1/4″	7/16 to 9/16	57/64 to 15/16
157-C	.60	1/2 Air	5/8″–18	7/16 to 9/16	51/64 to 15/16
153-C	.50	3/8 Fluid	1/4″	5/16 to 7/16	21/32 to 11/16
158-C	.50	3/8 Fluid	3/8″	5/16 to 7/16	21/32 to 11/16
154-C	.50	3/8 Fluid	5/8″–18	5/16 to 7/16	21/32 to 11/16
160-C	.50	3/8 Fluid	9/16″–18	5/16 to 7/16	21/32 to 11/16
155-C	.60	1/2 Fluid	1/4″	7/16 to 9/16	51/64 to 7/8
156-C	.60	1/2 Fluid	5/8″–18	7/16 to 9/16	51/64 to 7/8
159-C	.60	1/2 Fluid	3/8″	7/16 to 9/16	51/64 to 7/8

Myers Self-Oiling Power Spray Outfits


No 726
200 GAL. TANK
MYERS
COMPLETE SELF-OILING POWER SPRAY OUTFIT
SELF-OILING PUMP
SEDIMENT CHAMBER
THE F.E.MYERS & BRO.CO. ASHLAND, OHIO.

Automatically controlled. Machine cut gear; back geared 5 to 1. Chain driven. 2½x2½ duplex or triplex pump; high pressure; 350 to 500 pounds.

Main frame is 4-inch channel steel with cross members, arc-welded. Entire length overall 98 inches; height 36 inches; width overall 40 inches.

Fitted with canvas side curtains.

Pump is Myers Self-Oiling No. 700X or 742X, with Myers Pressure Regulator and unloading valve with by-pass built in. Engine is 4 h.p. hopper cooled or 6 h.p., radiator cooled; roller bearing, variable speed (850 to 1500 r.p.m.) throttle governed, with magneto. Light weight, easy starting and dependable. Can be mounted on any farm wagon gear or farm truck. Capacity: Duplex pump 8 to 10 gallons per minute; triplex pump 12 to 15 gallons per minute.

Equipped as follows: 2 No. 13 Myers Spray Guns, 2 leads of 50 feet each Myers High Pressure Spray Hose with fittings complete, 2 single lever cut-offs on discharge lines, pressure gauge, rotary agitator, sediment chamber, pressure controller and unloading valve. Chain and sprockets.

No. **726X**, Self-Oiling Duplex Power Spray Outfit, 200 Gallon Tank, No. 700X Duplex Self-Oiling Spray Pump and Pressure Unloading Valve, Chain Driven, Equipped as above, 4 H.P. Engine Included. Weight 1230 Pounds.............each **$442.00**

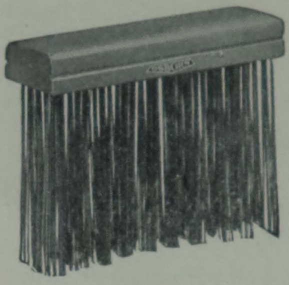
No. **723X**, Same as No. 726X Except with No. 742X Triplex Pump and 6 H.P. Engine...........each **590.00**

Osborn Handled Casting or Gear Brushes

Solid block. Tempered flat steel wire, 5 wires doubled per hole.

No.	15	20	17	21
Per Gross	$73.32	88.00	92.88	102.66
Size Block in.	12½x2¼	12½x2¼	12½x2¾	12½x2¾
No. of Rows	4x10	4x10	5x10	5x10
Length Wire in.	3	4	3	4
Approx. Ship. Wt. per Gross lbs.	159	178	194	216

Plain Steel Wire Casting Brushes



Made of first quality .017x .059 tempered flat steel wire, on hardwood block, 5 wires doubled per hole.

When desired, this casting brush can be fitted with leather or canvas web straps at an addition to regular price.

No.	Per Gross	Ship. Wt. Gross Lbs.	Wire Lgth. In.	Size Block In.
*1	$41.06	120	2	7¾x2¼
*2	48.78	130	3	7¾x2¼
*3	59.04	150	4	7¾x2¼
†5	47.42	140	2	7¾x2¾
†6	$59.04	155	3	7¾x2¾
†7	66.72	168	4	7¾x2¾
†8	75.78	190	5	7¾x2¾

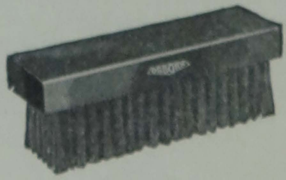
No. of Rows *4x10 †5x10

No. 1779 Painters' Wire Scratch Brushes

Short trimmed, full stiff brush for removing paint, varnish and wax, and for cleaning and preparing flat surfaces. Solid block, 7¼x2⅞ inches. Rows in width, 9; in length, 21. Steel wire, 1 3/32 inches long. Packed 12 in container. Wt. per gross, 140 pounds.

No. **1779**........per gross **$87.50**

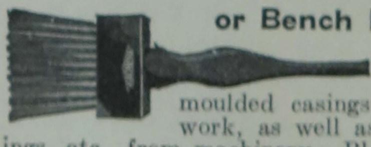
No. 1780 Fine Wire Scratch Brushes



For removing paint and varnish from surfaces to be refinished. Solid block, 7¼x2¼ in. Rows in width, 6; in length, 19. Length of steel wire, 1¾ in. Wt. per gross, 115 lbs. Packed one dozen in container.

No. **1780**......per gross **$58.32**

No. 1778 Osborn Wire Dusting or Bench Brushes



Made of black tempered wire. For cleaning moulded casings and all kinds of metal work, as well as for brushing chips, borings, etc., from machinery. Block, 2½x1⅛ inches. 4x8 rows. Length of wire, 2½ inches. Length over all 9¾ in.

No. **1778**, Wt. per gross, 45 Lbs............per gross **$58.32**

Steel Wire Scratch Brushes

The peculiar construction of this brush makes it effective for getting into corners and small out-of-the-way places. This is a handy pattern for household use. Its small size makes it convenient to carry in the tool box for general repair work or for brushing threads on pipe in installing gas or oil lines. Length brush, 5¼ inches; length over all, 10 inches. Packed one dozen in a container.

No.		1784	1781
Per Gross		$47.00	50.22
No. of Rows		2x15	4x16
Width of Block	inches	⅝	1 1/16
Length Wire	inches	1 3/32	1¼
Weight per Gross	pounds	35	60

No. 250 Moulders' Brushes

A soft haired brush, especially designed for moulders' use.

Has a solid hardwood block, staple set.

Pure black horse hair, trim 2⅞ in.

A full assortment of moulders' bench or dust brushes with handles can also be furnished. Prices upon request.

No. 250	per gross	$127.20
Size Block	inches	9x1⅛
No. of Rows		4
Shipping Weight per Gross	pounds	92

Packed one dozen in a container.

No. 665 Osborn Counter Dusters

The combination of fine steel wire and specially prepared black hair in this brush makes it unusually effective for heavy work in machine shops and for general factory use. The wire keeps the brush in shape and adds materially to its life and wearing qualities.

Solid red polished block, staple set, oval face; length of stock, 2¾ inches. Length, 8 inches.

Approximate weight per dozen, 9 pounds.

No. **665** ....each **$1.59**

Osborn Flat Wire Push Brooms

Heavy Sweeping

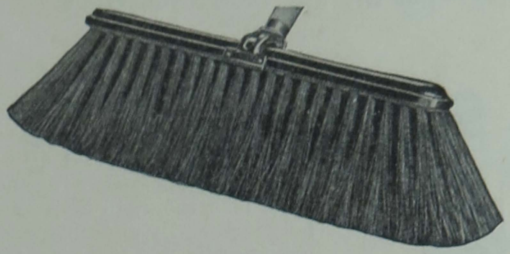
Selected two-piece hardwood block.

Filled with tempered flat steel wire, drawn for this purpose, and gives excellent results in use.

Length of wire, 5 inches. No. of rows, 4. Packed one dozen in a container. Handles are not included in prices.

No.		120	121	122
Per Dozen		$14.44	15.88	19.32
Size Block	inches	12x2⅜	14x2⅜	16x2⅜
Weight, per Dozen	pounds	28	32	38

Milwaukee Heavy Duty Speed-Sweeps



Made from a very stiff, but not coarse bassine. Powerful as a street broom but light in weight. For all heavy duty industrial, factory, garage and warehouse work.

All tufts brass wire drawn; not stapled; cannot come out.

Narrow, light weight wood block, 1 15/16 inches wide, with closely spaced tufts. Pressed steel reenforcing back clinched into block clear around; prevents splitting and chipping.

Varnished, hardwood handle fitted with steel screw and lock nut and protected from splitting by a steel ferrule.

Old handles may be used with new brushes at a saving of 15 cents per brush. Prices given include handles.

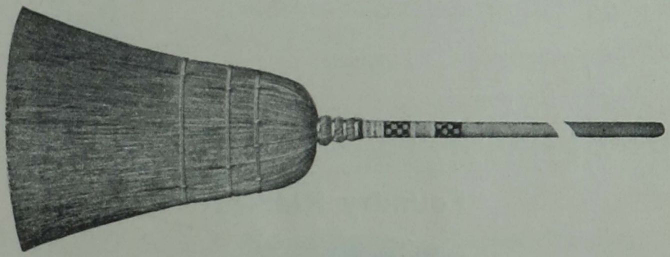
A scraper can be furnished for 25 cents per brush extra.

Brushes are packed individually.

No.	410	411	412	413	414	416	*417	*418
Each	$2.40	2.50	2.60	2.70	2.80	3.05	3.55	4.05
Length Block.in.	12	14	16	18	20	24	30	36
Ship. Wt.....lbs.	4	4	5	5	5	6	8	8

*Scraper cannot be attached.

Mill, Warehouse and Smelter Brooms



Used by factories, warehouses, railroads, smelters, etc.

Style	Per Doz.	No. Wire Blades	No. Rows of Stitching	Wt., Lbs. per Dozen
Warehouse	$13.00	1	3	36
Mill	15.00	2	3	40
Smelter	16.00	3	None	42

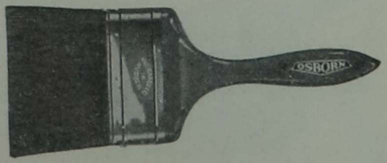
The smelter broom has a rattan center.

No. 550 Osborn Flat Varnish Brushes

Pure, black china bristle, chiseled. Nickeled ferrule, walnut finish handle. Vulcanized in rubber. Packed 12 in a container.

Size	in.	1	1½	2	2½	3
No. 550	per doz.	$1.48	2.10	2.94	3.96	5.66
Length	in.	1⅞	2⅛	2⅛	2⅛	2⅜
Ship. Wt.	lbs.	1	1⅞	2	2½	3

No. 438 Osborn Wall Brushes

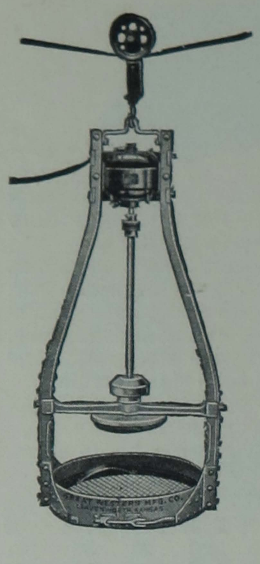


Pure black Chinese bristle, vulcanized in rubber, nickeled ferrule, walnut lacquered handle. Packed 6 in a box.

Size Inches	Length Bristle Inches	Approx. Ship. Wt. Lbs. per Doz.	Per Dozen	Size Inches	Length Bristle Inches	Approx. Ship. Wt. Lbs. per Doz.	Per Dozen
2½	2½	4¼	$8.00	4½	3⅜	8	$24.84
3	2¾	5¼	9.44	5	3⅝	9	34.56
3½	3	6¼	13.02	6	3⅞	10¼	45.78
4	3¼	7¼	17.86	...	...	....	.....

Type V Combs Gyratory Foundry Riddles

For Dry and Liquid Materials



The design of this machine is symmetrical and compact. The frame is rigid and strong, only one bearing outside of motor. Motor is totally enclosed and all bearings made dust-proof. There are no gears. Sieve is 20 inches in diameter and is held in place by an improved clamping device.

Motor is ⅙ horsepower and operates from any lamp socket. The machine is suspended by means of a hook or chain from any convenient support. There are no legs to get in the way of the shovel. A wheelbarrow can be run right under it if desired. Extremely portable.

For screening moulding and core sands in iron, brass and aluminum foundries. For compounds used in manufacture of rubber. For materials used in manufacture of stone brick and tile. For spices. For materials used in manufacture of window glass. For ingredients both dry and liquid used in porcelain manufacturing. For ingredients for chemical companies. For mixed paints, enamels and shellacs.

Height over all, 55 inches.

Width at large end, 25 inches.

Weight, 100 pounds.

Type V, for Dry Materials....................each	**$135.00**
Type V, for Liquid Materials..................each	**170.00**

Foundry Riddles

Made from foundry weight wire cloth firmly secured to well seasoned elm rims. Including two cross wires.

Size Inches	Price, per Dozen Brass 2 to 20 Mesh	Galv. Steel 2 to 8 Mesh	Plain Steel 2 to 10 Mesh
16	**$25.00**	**$16.00**	**$15.00**
18	**28.00**	**17.50**	**16.00**
20	**32.00**	**19.00**	**17.50**

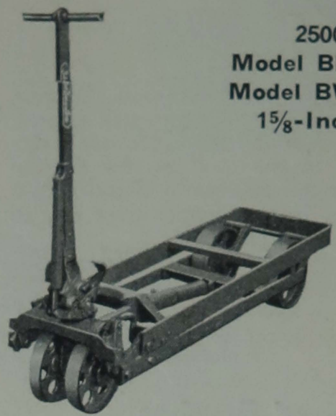
Finer mesh in brass or steel wire made up promptly.

No. 102 Christen Hand Bellows

Made of light weight, thoroughly dry lumber and covered with a good grade of leather.

Width Inches	Wt. Lbs. per Dozen	Price per Dozen	Width Inches	Wt. Lbs., per Dozen	Price per Dozen
6	15	**$12.00**	**10**	30	**$20.00**
7	18	**14.00**	**11**	35	**22.00**
8	20	**16.00**	**12**	40	**26.00**
9	25	**18.00**	..	..	.....

Models BN and BW Blue Streak Hand Lift Trucks (Stuebing Line)



2500-Pound Capacity
Model BN—17½ Inches Wide
Model BW—26⅜ Inches Wide
1⅝-Inch Standard Lift

Roller Bearings.

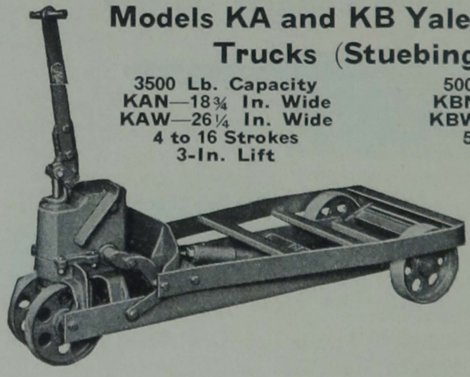
Side lift 90° arc.

Roller latch.

No.	Model BN Each	Model BW Each	Model BN No.	Model BN Each	Model BW No.	Model BW Each
6–24	**$102.00**	**$115.00**	**9–36**	**$117.00**	**9–36**	**$130.00**
6–30	**102.00**	**115.00**	**9–42**	**122.00**	**9–42**	**135.00**
6–36	**107.00**	**120.00**	**9–48**	**127.00**	**9–48**	**140.00**
6–42	**112.00**	**125.00**	**9–54**	**132.00**	**9–54**	**145.00**
6–48	**117.00**	**130.00**	**9–60**	**137.00**	**9–60**	**150.00**
7–30	**107.00**	**120.00**	**11–36**	**131.00**	**9–72**	**160.00**
7–36	**112.00**	**125.00**	**11–42**	**136.00**	**11–36**	**144.00**
7–42	**117.00**	**130.00**	**11–48**	**141.00**	**11–42**	**149.00**
7–48	**122.00**	**135.00**	**11–54**	**146.00**	**11–48**	**154.00**
7–54	**127.00**	**140.00**	**11–60**	**151.00**	**11–60**	**164.00**
7–60	**132.00**	**145.00**	**11–72**	**161.00**	**11–72**	**174.00**
9–30	**112.00**	**125.00**	.....	......	.....	......

When furnished with regular 2¼-inch high lift, add $5.00.

Models KA and KB Yale Selective Lift Trucks (Stuebing Line)



3500 Lb. Capacity
KAN—18¾ In. Wide
KAW—26¼ In. Wide
4 to 16 Strokes
3-In. Lift

5000 Lb. Capacity
KBN—19 In. Wide
KBW—26½ In. Wide
5 to 20 Strokes
3-In. Lift

Side Lift

Any Angle

Balanced Handle

Timken Thrust Bearing Head

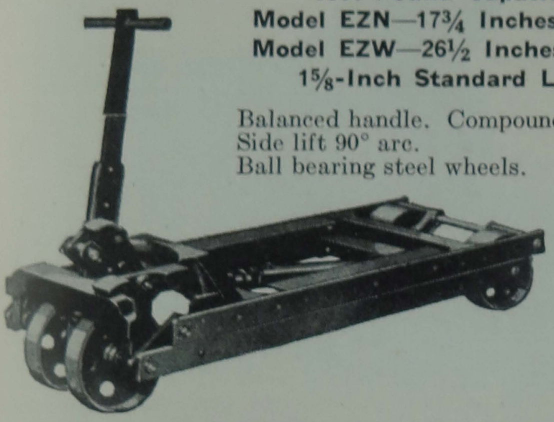
No.	*Ball Bearing Steel Wheels KAN Each	KAW Each	KBN Each	KBW Each	Deduct for Semi-Steel Wheels KA	KB
6–30	**$187.00**	**$202.00**	**$221.00**	**$238.00**	**$7.00**	**$9.00**
6–36	**192.00**	**207.00**	**227.00**	**244.00**	**7.00**	**9.00**
6–42	**197.00**	**212.00**	**233.00**	**250.00**	**7.00**	**9.00**
6–48	**202.00**	**217.00**	**239.00**	**256.00**	**7.00**	**9.00**
7–30	**193.00**	**208.00**	**228.00**	**245.00**	**7.00**	**9.00**
7–36	**198.00**	**213.00**	**234.00**	**251.00**	**7.00**	**9.00**
7–42	**203.00**	**218.00**	**240.00**	**257.00**	**7.00**	**9.00**
7–48	**208.00**	**223.00**	**246.00**	**263.00**	**7.00**	**9.00**
7–54	**213.00**	**228.00**	**252.00**	**269.00**	**7.00**	**9.00**
7–60	**218.00**	**233.00**	**258.00**	**275.00**	**7.00**	**9.00**
9–30	**202.00**	**217.00**	**240.00**	**257.00**	**10.00**	**12.00**
9–36	**207.00**	**222.00**	**246.00**	**263.00**	**10.00**	**12.00**
9–42	**212.00**	**227.00**	**252.00**	**269.00**	**10.00**	**12.00**
9–48	**217.00**	**232.00**	**258.00**	**275.00**	**10.00**	**12.00**
9–54	**222.00**	**237.00**	**264.00**	**281.00**	**10.00**	**12.00**
9–60	**227.00**	**242.00**	**270.00**	**287.00**	**10.00**	**12.00**
9–66	......	**247.00**	......	......	.....	.....
9–72	**237.00**	**252.00**	**282.00**	**299.00**	**10.00**	**12.00**
11–36	**225.00**	**240.00**	**265.00**	**282.00**	**12.00**	**15.00**
11–42	**230.00**	**245.00**	**271.00**	**288.00**	**12.00**	**15.00**
11–48	**235.00**	**250.00**	**277.00**	**294.00**	**12.00**	**15.00**
11–54	**240.00**	......	......	......	.....	.....
11–60	**245.00**	**260.00**	**289.00**	**306.00**	**12.00**	**15.00**
11–72	**255.00**	**270.00**	**301.00**	**318.00**	**12.00**	**15.00**

*For Hyatt roller bearing wheels, deduct $15.00.

Models EZN and EZW Red Streak Hand Lift Trucks (Stuebing Line)

3500-Pound Capacity
Model EZN—17¾ Inches Wide
Model EZW—26½ Inches Wide
1⅝-Inch Standard Lift

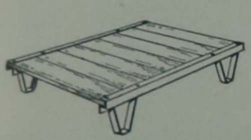
Balanced handle. Compound lift.
Side lift 90° arc.
Ball bearing steel wheels.



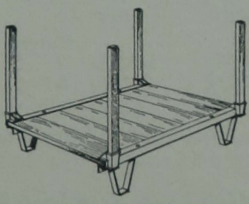
No.	Model EZN Each	Model EZW Each	Deduct for Semi-Steel Wheels	No.	Model EZN Each	Model EZW Each	Deduct for Semi-Steel Wheels
6–30	$142.00	$157.00	$7.00	9–36	$162.00	$177.00	$10.00
6–36	147.00	162.00	7.00	9–42	167.00	182.00	10.00
6–42	152.00	167.00	7.00	9–48	172.00	187.00	10.00
6–48	157.00	172.00	7.00	9–54	177.00	192.00	10.00
7–30	148.00	163.00	7.00	9–60	182.00	197.00	10.00
7–36	153.00	168.00	7.00	9–72	192.00	207.00	10.00
7–42	158.00	173.00	7.00	11–36	180.00	195.00	12.00
7–48	163.00	178.00	7.00	11–42	185.00	200.00	12.00
7–54	168.00	183.00	7.00	11–48	190.00	205.00	12.00
7–60	173.00	188.00	7.00	11–60	200.00	215.00	12.00
9–30	157.00	172.00	10.00	11–72	210.00	225.00	12.00

When furnished with regular 2¼-inch high lift, add $5.00.
For Hyatt roller bearing wheels, deduct $5.00.

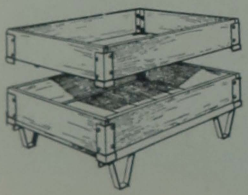
Yale Steel Bound Skid Platforms



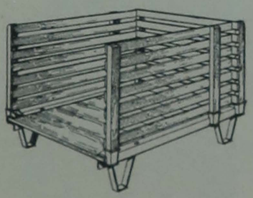
Yale Standard



With Stake Pockets



Sectional Bin Type



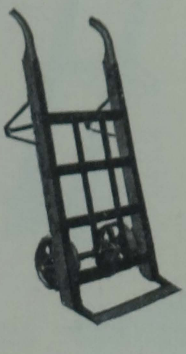
Slat Bin Type

Made in a complete range of size and capacity in both standard and special designs, in either the bolted or welded type.

In the special designs, the illustrations above are typical of the modifications that may be made to the standard Yale Steel Bound to handle some special commodity. Special designs can be furnished with the top structure designed to suit practically any commodity within the load capacity of the trucks. Special units have been furnished to handle such diversified commodities as glassware, plate glass, food products, foundry sand and castings, bolts, puts, forgings, machine products, printed matter, paper, etc.

Prices and data upon application.

No. 202-4 K. & J. Railroad and Warehouse Trucks



Full Ironed

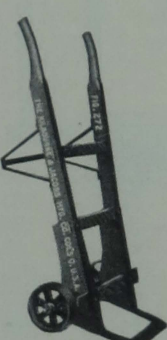
Made of carefully selected materials, well constructed, and is amply strong for all ordinary uses.

This is a heavy truck with two additional steel center straps.

Length Handles	in.	60
No. **202-4**	each	.....
Greatest Width	in.	24¾
Length Nose	in.	6
Size Wheel	in.	11x2½
Approx. Weight	lbs.	118

No. 272A K & J Warehouse Trucks

Full Strapped



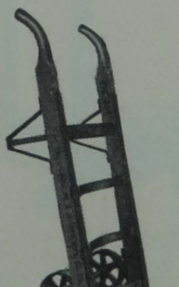
Made of carefully selected materials, well constructed, and is amply strong for all ordinary uses.

Designed to meet the demand for a tapered frame truck for warehouse and wharf uses.

Long nose makes it especially suited for handling grain bags.

No.	1	2	3	4
Each	....	....	....	....
Lgth. Handles.....in.	48	52	56	64
Greatest Width...in.	21⅜	23⅝	25⅜	26½
Lgth Nose........in.	5	6	7	7¼
Approx. Wt......lbs.	50	65	76	95

No. 207 K & J Wood Frame Barrel Trucks



Full Ironed

Made of carefully selected materials, well constructed, and amply strong for all ordinary uses.

With curved steel crossbars for handling barrels. Can be furnished with either rubber or fibre-tired wheels.

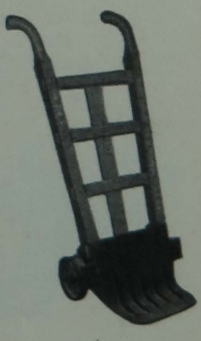
Made in three sizes.

Size No.	Lgth. Handles In.	Greatest Width In.	Lgth. Nose In.	Approx. Wt. Lbs.	Price Each
1	48	20⅝	5	50	.....
2	52	20⅝	5	65	.....
3	56	24¾	5	90	.....

No. 217 K & J Bag Trucks

Made of carefully selected materials, well constructed, and is amply strong for all ordinary uses.

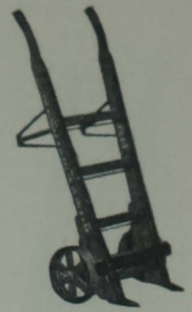
Provided with pressed steel nose; this nose is a marked improvement over the old cast iron nose, being much lighter as well as more durable.



Lgth. Handles In.	Greatest Width In.	Lgth. Nose In.	Approx. Wt. Lbs.	Price Each
48	24¼	8	45	.....

No. 5 New Orleans Cotton Trucks

Full Ironed



Has substantial construction and is high grade in every respect.

Full ironed with beveled steel points.

Has square axles, bearing on steel wearing plates, attached by bolts.

Varnished, with iron parts black.

Size No.	Lgth. Hdle. In.	Width at Nose In.	Greatest Width In.	Lgth. Points In.	Size Wheel In.	Size Axle In.	Approx. Weight Pounds	Price Each
213	66	16¼	27¼	3	12x2½	1¼	110	.....

No. 390 Freight House Trucks

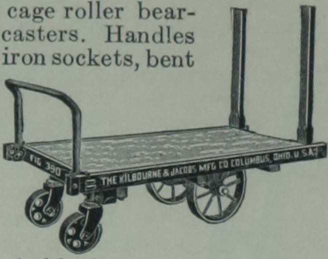


FIG. 390
THE KILBOURNE & JACOBS MFG. CO. COLUMBUS, OHIO, U.S.A.

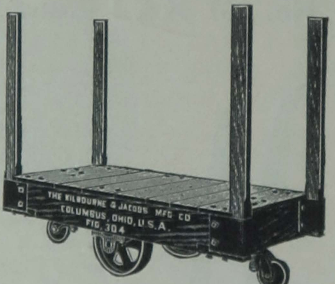
A heavy design truck, with cage roller bearing wheels and ball bearing casters. Handles are heavy pipe set in malleable iron sockets, bent at top to prevent load from interfering with grasp. Can be furnished with pipe handles at both ends and side stake pockets into which pipe handles may be fitted when it is desired to leave ends clear for carrying extending loads. Varnished, with iron parts black.

Platform, 36 inches wide, 72½ inches long, and 19½ inches high; height of stakes, 25 inches; height of handle, 17¾ inches; size of large wheels, 18x3½ inches; size of caster wheels, 8½x2½ inches; size of axle, 1½ inches square.

Weight, approximately, 330 pounds.

Price, No. **390**................................each .....

No. 304 Factory Trucks


THE KILBOURNE & JACOBS MFG CO
COLUMBUS, OHIO, U.S.A.
FIG. 304

These trucks balance on center wheels and can be turned in a truck's length. Swivel caster at each end. Platform frame is tied at each corner by steel connection angles, 2½x2½x¼ in. and bolted in place.

No.	Each	Platform, In. Lgth.	Platform, In. Width	Platform, In. Ht.	Ht., In. Stakes	Wheels, In. Center	Wheels, In. Caster	Approx. Wt., Lbs.
1	....	48	23¾	14	30	11x2½	5x1¼	163
1A	....	48	30	14	30	11x2½	5x1¼	173
1X	....	60	23¾	14	30	11x2½	5x1¼	174
1XX	....	60	30	14	30	11x2½	5x1¼	185
2	....	60	36	14½	30	12x2½	5x1¼	202
3	....	60	36	19½	30	14x2¾	8x2	259

No. 249 Wagon and Grain Trucks

This wagon is for use about warehouses, factories, etc., for handling any material lighter than sheet metal. Solidly built and strong.

No.	Platform, In. Length	Platform, In. Width	Ht.
1	36	24	12¾
2	38	26	12¾
3	40	28	12¾
4	42	30	12¾
5	44	32	12¾
6	46	34	12¾

No.	Wheels In.	Approx. Wt., Lbs.	Price Each
1	8x2½	120	.....
2	8x2½	125	.....
3	8x2½	130	.....
4	8x2½	140	.....
5	8x2½	147	.....
6	8x2½	155	.....

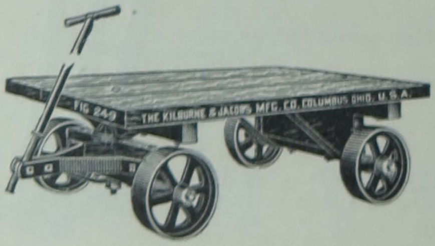
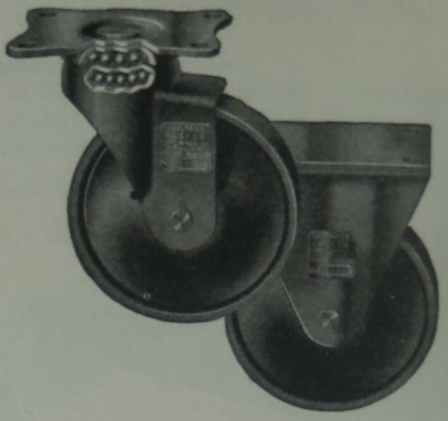


FIG 249
THE KILBOURNE & JACOBS MFG. CO. COLUMBUS, OHIO, U.S.A.

Darnell Medium Duty Industrial Casters



These casters have the Darnell patented double ball-bearing swivel with carbonized, hardened, perfectly round balls that roll freely in large hardened races which make for easy swiveling. Made rust-proof with cadmium plating and finished in laguna blue.

Alemite push-type lubrication, using round nose nipple, is provided. String guards are standard equipment.

Swivel Casters

Semi-Steel Tread

Model No.	Each	Wheel, In. Diam.	Wheel, In. Width	Top Plate C. to C. of ⅜-In. Holes Inches	Size Over All of Plate Inches	Approx. Height Over All Inches	Wt. Lbs. Each
1-73	**$4.00**	3	1⅜	2⅝x3⅝	3½x4½	4 7/16	3½
1-74	**4.35**	4	1⅜	2⅝x3⅝	3½x4½	5 7/16	4
1-75	**4.70**	5	1⅜	2⅝x3⅝	3½x4½	6 7/16	5
			Rubber Fibre Tread				
1-73-K	**$4.00**	3	1⅜	2⅝x3⅝	3½x4½	4 7/16	3
1-74-K	**4.35**	4	1⅜	2⅝x3⅝	3½x4½	5 7/16	3¼
1-75-K	**4.70**	5	1⅜	2⅝x3⅝	3½x4½	6 7/16	4

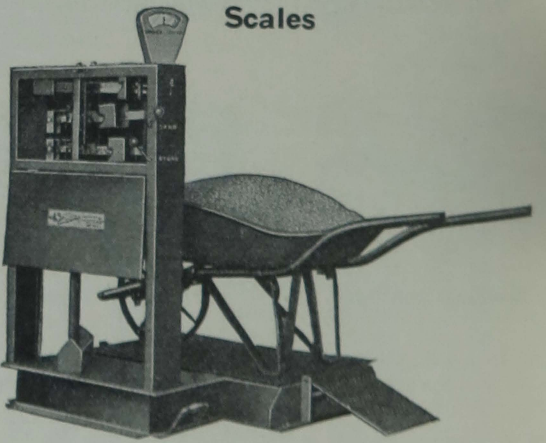
Stationary Casters

Semi-Steel Tread

Model No.	Each	Wheel, In. Diam.	Wheel, In. Width	Top Plate C. to C. of ⅜-In. Holes Inches	Size Over All of Plate Inches	Approx. Height Over All Inches	Wt. Lbs. Each
14-74-S	**$3.35**	4	1⅜	3x4	4x5	4 7/16	4
14-75-S	**3.70**	5	1⅜	3x4	4x5	5 7/16	5
14-75-SS	**4.00**	5	1⅜	3x4	4x5	6 7/16	5
			Rubber Fibre Tread				
14-74-S-K	**$3.35**	4	1⅜	3x4	4x5	4 7/16	3¼
14-75-S-K	**3.70**	5	1⅜	3x4	4x5	5 7/16	4
14-75-SS-K	**4.00**	5	1⅜	3x4	4x5	6 7/16	4

For hard rubber fibre wheels substitute H for K in model no.; for soft rubber wheels substitute D for K.

Winslow Junior Portable Wheelbarrow Scales

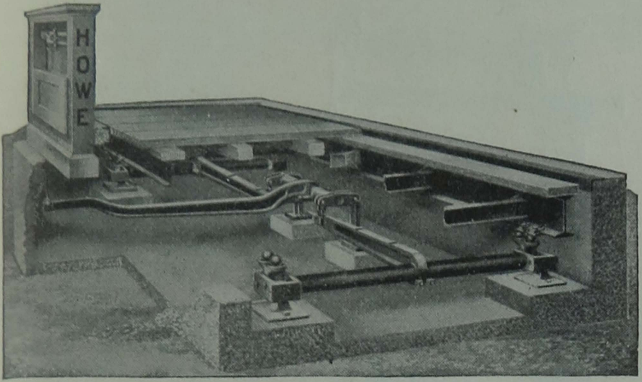


For bridge and culvert work, or where concrete aggregates are weighed. Meets highway requirements. All steel construction. Equipped with 2 material beams, each graduated to 500-pound capacity, one for sand and one for coarse aggregates; additional beams can be furnished at extra cost. Has 2-pound graduations. A tare beam is provided to balance the wheelbarrow or cart. A sensitive springless tell tale dial is used to determine when load is in balance. All parts are fully protected from dust and moisture.

Each. Shipping Weight, 295 lbs.................. **$175.00**

Howe Light Truck and Wagon Scales

With Improved Double Brass Beam



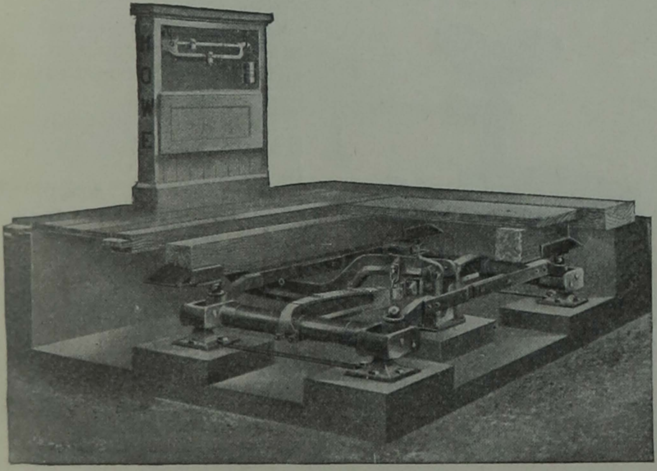
Used on farms, plantations, ranches, and other establishments for the weighing of grain, cotton, hay, raw wool, hides, etc. Has ball-bearing knife edge protection.

All scales come regularly equipped with Howe Full Capacity Beam and short-pillar office beam fixtures. Beam box furnished at extra cost.

			Full Capacity Beam			Edge	
			Upper	Lower Bar, Lbs.		Platform	Ship.
	Cap.	Platform	Bar	1st	2nd	to Beam	Wt.
No.	Tons	Feet	Lbs.	Space	Space	Rod, Ft.	Lbs.
1170	5	14x 8	8000x200	200x5	2000x5	3½	1200
251	10	16x 8	16000x500	500x5	4000x10	3½	1495
250	10	18x 8	16000x500	500x5	4000x10	3½	1635
248	10	22x 8	16000x500	500x5	4000x10	3½	1700

Prices and full information upon request.

Howe Depot and Warehouse Scales
With Double Beam and Beam Box Fixtures

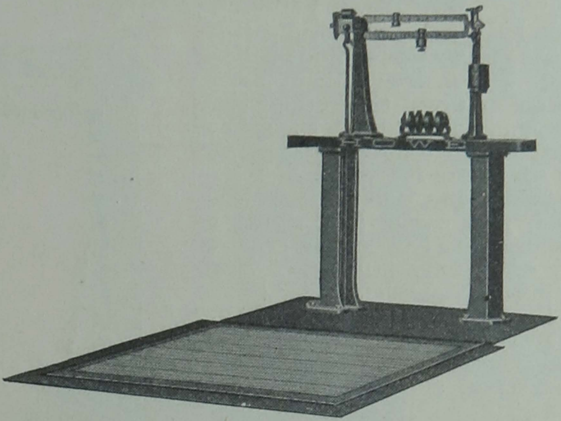


For heavy duty; furnished equipped with Howe bronze double beam and fixtures for wooden beam box. All foundations and materials for erection to be furnished by purchaser.

		Plat-	Beam		Platform		
	Cap.	form	Upper	Lower	to Beam	Wt.	
No.	Tons	Ft.	Bar, Lbs.	Bar, Lbs.	Rod, Ft.	Lbs.	Each
231	4	6x4	500x2½	500x2½	3	955	**$185.00**
230	4	6x5	500x2½	500x2½	2½	980	**200.00**
788	6	6x5	1000x2½	2000x5	2½	1000	**230.00**
780	6	8x6	1000x2½	2000x5	2	1225	**240.00**
1237	6	10x4	1000x2½	2000x5	3	1110	**245.00**
1238	6	9x7	1000x2½	2000x5	2⅝	1150	**250.00**
784	10	6x5	1000x2½	2000x5	2½	1033	**280.00**
776	10	8x6	1000x2½	2000x5	2	1110	**290.00**
1239	10	10x4	1000x2½	2000x5	3	1190	**300.00**

Short iron pillar beam outfit, price extra; wooden beam box with lock, price extra. Platform sizes show first figure parallel with the beam.

Howe Dormant Warehouse Scales



Installed with platform flush with floor. Upper bar has sliding poise and is graduated 100x½ pounds; lower bar has set screw poise and is graduated 200x1 pounds for tare.

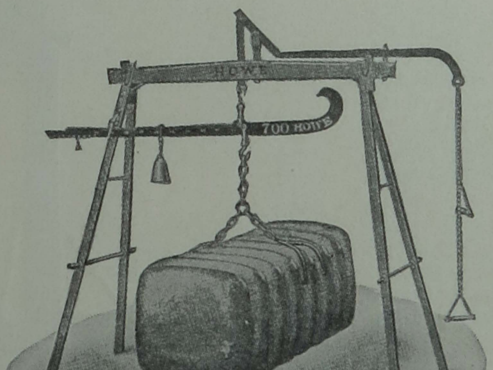
Indexing counter-poise is regular. Weights are used to give full capacity.

Finish, black enamel, bronze stripe, and Howe blue, well varnished.

No.	Each	Capacity Pounds	Platform Inches	Platform to Pillar Inches	Extreme Size Floor Opening Inches	Shipping Weight Pounds
1217	**$300.00**	6000	60x54	16⅛	61 x78½	1530
1365	**270.00**	5000	60x54	16⅛	61 x78⅛	1500
1083	**260.00**	5000	48x48	16⅛	48¾x72	1190
1283	**255.00**	3500	76x52	6½	....	1410
1085	**205.00**	3500	43x45	17⅜	44 x70½	960
1218	**230.00**	3000	54x48	15½	55 x72	910
1089	**190.00**	2500	38x46	15¼	39 x69¼	760
1090	**190.00**	2500	46x38	15¼	47 x61⅝	770
536	**205.00**	1500	48x54	15½	48¾x77⅞	820

Platform sizes show first figure parallel with the beam.

Howe Southern Cotton Beam and Frame Scales

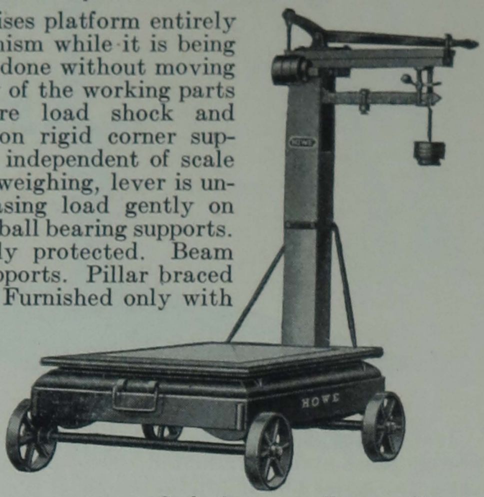


Beams and frames are built strong to meet exceptional service required of them; constructed so that they can be quickly knocked down to permit easy transportation. Beams are graduated on both sides to 700 or 800-pound marks and with one 16-pound poise.

Capacity Pounds	Description	Shipping Wt., Lbs.	Price Each
700x1	Japanned Beam, Notched Top......	220	**$91.00**
700x1	Polished Steel Blade, Notched Top..	220	**105.00**
700x1	Japanned Beam, Smooth Top.......	220	**90.00**
700x1	Polished Steel Blade, Smooth Top...	220	**104.00**
800x1	Japanned Iron, Notched Top......	250	**106.00**
800x1	Polished Steel Blade, Notched Top..	250	**121.00**
800x1	Japanned Iron, Smooth Top........	250	**105.00**
800x1	Polished Steel Blade, Smooth Top...	250	**120.00**

Howe Portable Platform Scales

With Drop Lever and Wheels



Drop lever raises platform entirely off scale mechanism while it is being loaded. This is done without moving the beam or any of the working parts of scale. Entire load shock and weight carried on rigid corner supports which are independent of scale mechanism. In weighing, lever is unhooked, thus easing load gently on shock absorbing ball bearing supports. Knife edges fully protected. Beam hung in rigid supports. Pillar braced with iron rods. Furnished only with solid bronze single beam, poise and set screw.

No.	Each	Capacity Pounds	Graduation Beam Pounds	Size Platform Inches	Shipping Weight Pounds
76	**$150.00**	4000	100x½	32x40	1000
79	**100.00**	2500	100x½	26x34	555
82	**90.00**	2000	100x½	23x32	490
84	**70.00**	1500	100x½	21x30	405
88	**53.00**	1000	100x½	17x26	295

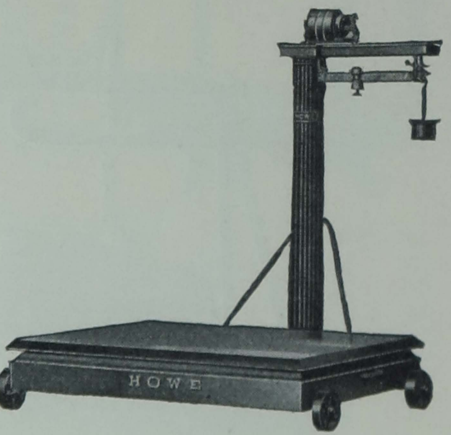
Without Drop Lever

Regular Portable with Wheels

No.	Each	Capacity Pounds	Graduation Beam Pounds	Size Platform Inches	Shipping Weight Pounds
18	**$90.00**	2500	100x½	26x34	450
22	**80.00**	2000	100x½	23x32	395
24	**60.00**	1500	100x½	21x30	325
28	**38.00**	1000	100x½	17x26	220
30	**33.00**	500	50x¼	16x24	160

Howe All Metal Portable Scales

With and without Wheels



This scale has the Howe ball bearing platform support to absorb the shocks and vibrations of daily service. Knife edges are preserved from injury.

Two inclines are regularly furnished with each scale and fit into brackets cast on each end of frame.

Wheelbarrow loads easily run on and off platform.

Regular beam is single, is solid bronze with set screw poise. Durably finished in black.

With Incline, without Wheels

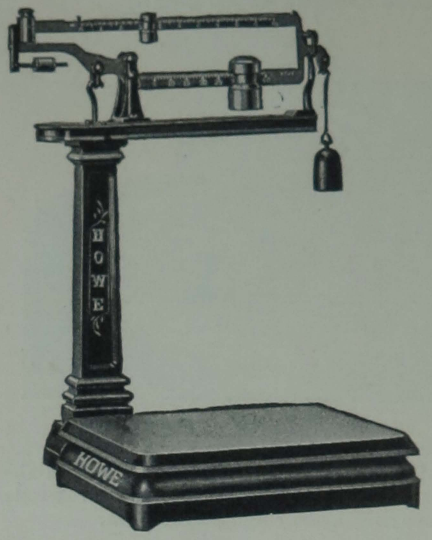
No.	Capacity Pounds	Beam Pounds	Platform Inches	Shipping Weight Pounds
143	1000	100x½	43x30	690
1114	2000	100x½	44x35	817

With Incline, with Wheels

No.	Capacity Pounds	Beam Pounds	Platform Inches	Shipping Weight Pounds
142	1000	100x½	43x30	760
1113	2000	100x½	44x35	885

Platform sizes show first figure parallel with the beam. Prices and full information upon request.

Howe Single Pillar Counter Scales



These scales are fitted with beam graduated on both sides.

The upper bar is smooth and is graduated one ounce to 10 pounds.

The lower bar is notched and is graduated eight ounces to 40 pounds.

The bronze beam is elevated so that commodity on platform will not obstruct reading of graduations on beam.

Equipped with bottle weight drawing 50 pounds; no other loose weights are required.

Can be furnished with agate bearings in fulcrum stand when specified, at an additional cost.

No. 810 is furnished with tin scoop; No. 812 with brass scoop; No. 814 is furnished without scoop.

Finished in grey with black stripe and ornamentations.

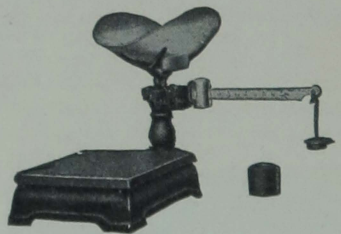
Beam and poises are nickel-plated.

Capacity, 100 pounds. Size platform, 12x12 inches.

No.	**810**	**812**	**814**
Each	**$25.50**	**27.00**	**24.00**
Shipping Weight ....pounds	55	51	45

Fairbanks Platform Counter Scales

With Patented Split-hoop Scoop and Fork



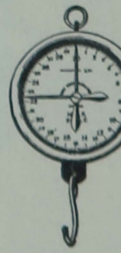
This scale is equipped with a split-hoop scoop and fork, allowing the scoop to be set upon a counter.

Platform is 10½x13½ in. Scoop size, 18½x9x5¼ inches.

Capacity in scoop, 25 pounds by ½ ounce; on platform, 250 pounds by ¼ pound.

No.	Description	Shipping Weight Pounds	Price Each
508	Single Beam, Tin Scoop	57	**$18.00**
510	" " Brass Scoop	57	**20.00**
512	Double " Tin "	58	**20.00**
514	" " Brass "	58	**22.00**

No. 2700 Chatillon Spring Scales

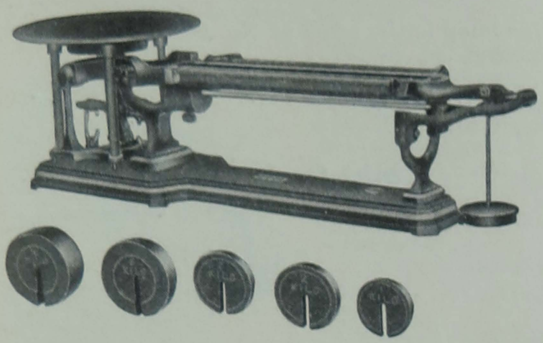


Has 7-inch lacquered brass dial. The back case measures 8¼ inches outside.

Capacity, 40 pounds by 1/10 of a pound. The dial reads 30 pounds, and the indicator makes 1½ revolutions for the full capacity.

No. **2700**..each **$4.25**

No. 80 Troemner's Solution Scales



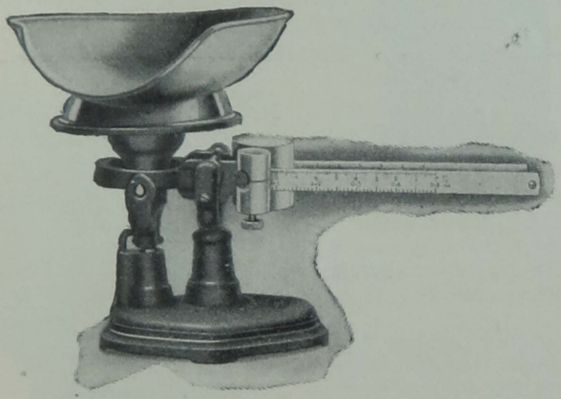
Provided with 2 weighing beams and sliding poises. One of these is divided into 100 parts, each part representing one gram; the other beam is divided into 10 parts, each part representing 100 grams. A bar with a sliding poise is placed under the weighing beam, for the purpose of balancing the empty bottle or container, which is quickly done by sliding the poise along the bar until a correct balance is secured. Will also weigh liquids with accuracy.

Capacity, 20 kilos (about 45 pounds); sensibility, 1 gram.

Shipping weight, 100 pounds.

No. **80**......................................each **$58.50**

No. 11413 Moisture Percentage Scales



Moisture percentage scales are used to quickly ascertain the amount of moisture in ores. A sample is weighed out to the full capacity of the scale. The ore is then dried or roasted in an oven and re-weighed, and the correct percentage of moisture is given directly by the percent graduations at the bottom of the beam. No calculations are necessary.

The scoop for holding the material is made of brass and is formed with a hoop base for convenience in setting. The double beam and poise are also of brass.

The base of the scale is finished in maroon enamel with bronze striping.

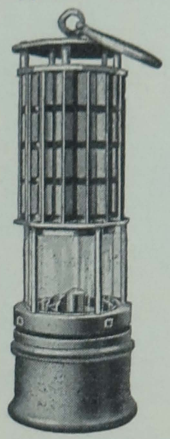
Capacity, 5 pounds. Beam—front bar: Upper row, 10x0.1 per cent; lower row, 0.5x0.01 pound. Back bar: Upper row, 4.5x0.5 pounds; lower row, 90x10 per cent.

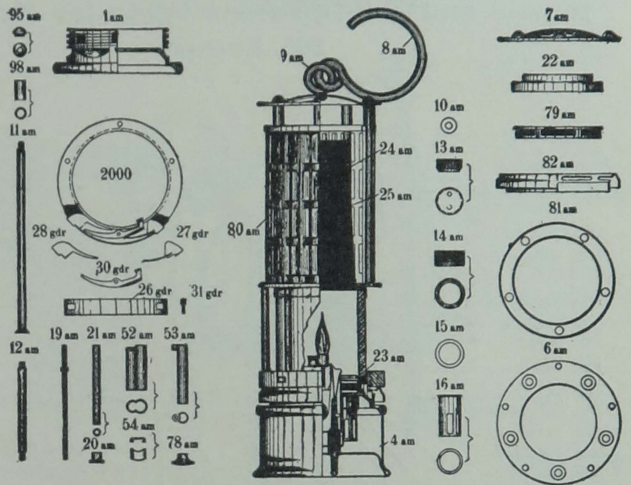
No. **11413**..................................each **$30.00**

Assay and Pulp
BALANCES
Catalogs and literature sent
upon request.

No. 100 Wolf's Miners' Naphtha Safety Lamps

U.S. Bureau of Mines Approval Nos. 204, 205, 206 and 208





Has round or flat burner, taking air from below. Has corrugated shield, internal igniter and magnetic lock or key lock.

Made in steel, brass and aluminum.

When ordering lamps, please state whether they are wanted with round or flat burner and whether they are desired with metal or paraffin igniter.

Can also be furnished for burning vegetable oil.

Parts

No.	Description	No.	Description
1am	Top of Lamp Fount	**22**am	Gauze Ring
4am	Lamp Fount	**23**am	Expansion Ring
5am	Spring Ring	**24**am	Outer Wire Gauze
6am	Middle Ring	**25**am	Inner " "
7am	Dome Top of Lamp with 5 Nuts (95 am)	**52**am	Burner for Round Wick
8am	Handle of Lamp		
9am	Eyelet	**53**am	Wick Holder for Round Wick
10am	Washer		
11am	Rods with Screw Heads	**54**am	Wick Stop for Round Wick
12am	Rods Fronting Glass Chimney	**78**am	Wick Adjuster Knob
13am	Filling Hole Stopper	**79**am	Air Admission Ring with Double Wire Gauze
14am	" " with Screw Thread	**80**am	Corrugated Shield
15am	Leather Washer	**81**am	Strengthening Ring for Shield
16am	Cylindrical Cotton Spreader	**82**am	Protecting Ring for Air Admission
19am	Wick Adjuster		
20am	Bushing	**95**am	Nut for **11**am
21am	Wick Adjuster Guide Tube	**98**am	Tube for Fastening **81**am

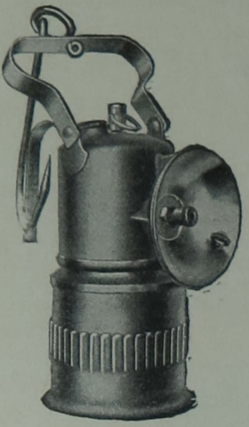
Ordinary Magnetic Lock

2000	Complete Magnetic Lock	**28**gdr	Tail Pole
		29gdr	Spring
26gdr	Plate Covering Lock	**30**gdr	Anchor Beam
27gdr	Spring Pole	**31**gdr	Screw for Same

In ordering parts, please state whether same are required for a steel, brass or aluminum lamp.

Prices upon application.

No. 205 ITP Mine Lamps



Water tank and carbide container of extra heavy drawn double tinned steel; water lid, valve parts, and screws of brass. Also made in all brass.

Fitted with No. 7 chromium plated reflector, 3½ inches in diameter and ⅞ inch deep; equipped with spark lighter.

Projects light beam 50 feet.

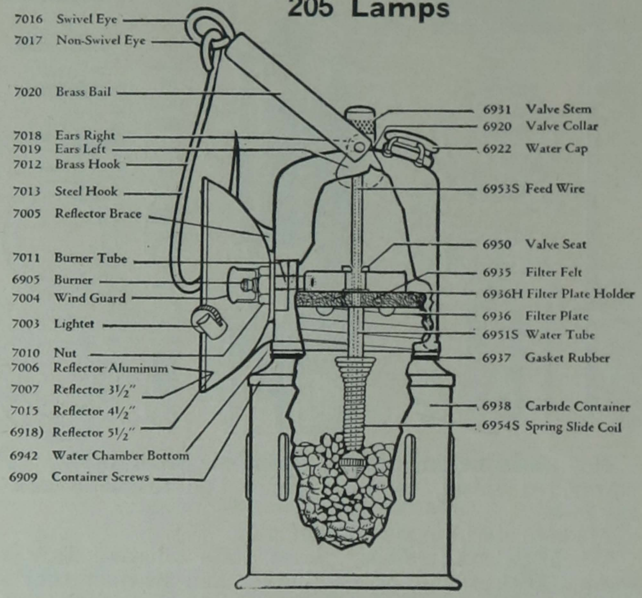
Will burn for 9 hours on 1 charge of carbide.

Height to lamp top 6½ inches; height to bail top 9¾ inches.

Weight 24 ounces.

No. **205**..............each **$4.50**

Repair and Replacement Parts for No. 205 Lamps


7016 Swivel Eye
7017 Non-Swivel Eye
7020 Brass Bail
7018 Ears Right
7019 Ears Left
7012 Brass Hook
7013 Steel Hook
7005 Reflector Brace
7011 Burner Tube
6905 Burner
7004 Wind Guard
7003 Lightet
7010 Nut
7006 Reflector Aluminum
7007 Reflector 3½"
7015 Reflector 4½"
6918) Reflector 5½"
6942 Water Chamber Bottom
6909 Container Screws
6931 Valve Stem
6920 Valve Collar
6922 Water Cap
6953S Feed Wire
6950 Valve Seat
6935 Filter Felt
6936H Filter Plate Holder
6936 Filter Plate
6951S Water Tube
6937 Gasket Rubber
6938 Carbide Container
6954S Spring Slide Coil

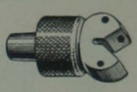
No.	Name of Part	Each
7016	Swivel Eye..................................	**$.07**
7017	Non-Swivel Eye..............................	**.07**
7020	Brass Bail..................................	**.17**
7018	Ears Right..................................	**.07**
7019	Ears Left...................................	**.07**
7012	Brass Hook..................................	**.14**
7013	Steel Hook..................................	**.14**
7005	Reflector Brace.............................	**.20**
6909	Container Screws............................	**.45**
6920	Valve Collar................................	**.10**
6953-S	Feed Wire.................................	**.05**
6936-H	Filter Plate Holder.......................	**.05**
6951-S	Water Tube................................	**.10**
6937	Gasket......................................	**.10**
6954-S	Spring Slide Coil.........................	**.10**
6952	Outer Water Tube............................	**.20**
7011	Burner Tube.................................	**.15**
7004	Wind Guard..................................	**.10**
6905	Burner......................................	**.05**
7003	Lighter.....................................	**.10**
7010	Nut...	**.03**
7006	Reflector Aluminum, with Sparker Lighter...	**.45**
	Reflector Aluminum, without Sparker Lighter	**.35**
7007	Reflector, 3½ In., with Sparker Lighter......	**.40**
	Reflector, 3½ In., without Sparker Lighter...	**.30**
7015	Reflector, 4½ Inches, C. P................	**1.90**
6918	Reflector, 5½ Inches, C. P................	**1.90**
6942	Water Chamber Bottom Assembly..........	**.95**
6931	Valve Stem..................................	**.10**
6922	Water Cap...................................	**.10**
6950	Valve Seat..................................	**.10**
6935	Filter Felt.................................	**.03**
6936	Filter Plate................................	**.05**
6938	Carbide Container........................	**1.00**

No. 206 I.T.P. Brass Lamps

This lamp is the same as No. 205 except that it is made of brass.

No. **206**.......................................each **$3.50**

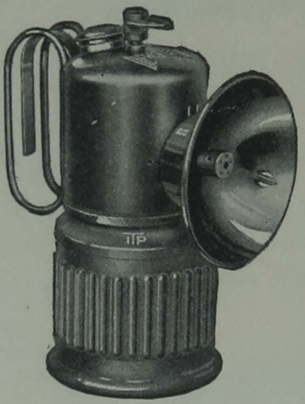
Slip Socket Burners



A double (flat flame) burner for Nos. 205 and 206 I.T.P. lamps.

Each.. **$.20**

No. 204 I.T.P. Superintendent's Lamps



No. 204 ITP Superintendent's Lamp is of brass non-magnetic, chrome plated

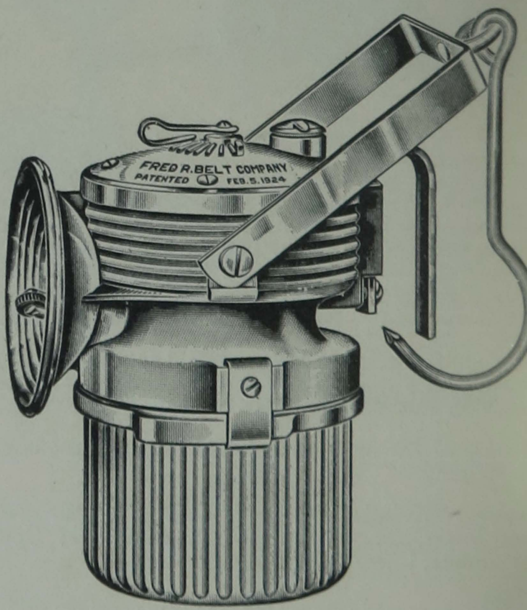
Height, 6½ inches, burning capacity 8 hours, 3½-inch reflector with lighter attachment and wind guard.

Weight, 19 ounces.

No. **204**............each **$3.50**

No. 7 Lu-mi-num Miners' Carbide Lamps

With Locking Device


FRED R. BELT COMPANY
PATENTED FEB. 5. 1924

A fool-proof miner's lamp with automatic drop water feed with self-cleaning valve. Made of aluminum, cast in steel dies. Rust-proofed steel bail and hook. Detachable handle fits in slot; rust-proof. Specially designed ball screw; will not work loose.

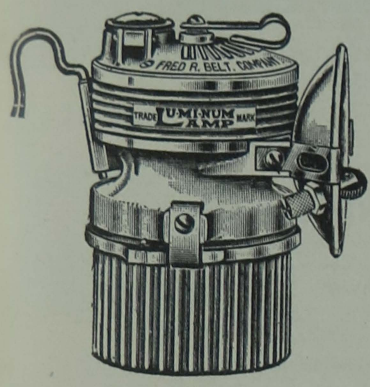
Burning capacity, 5 to 6 hours. Height, 5¾ inches, exclusive of bail. Diameter cup, 3 inches; bottom edge ¼ inch thick. Metal is 3/32 inch thick, exclusive of the ribs.

Weight, 26 ounces.

No. 7, with 3-Inch Brass N. P. Reflector.......each **$4.25**

Lu-mi-num Miners' Carbide Lamps

With Locking Device



No. 4

Made in two styles, with round hook for use on regular miner's cap or with flat hook for use on waterproof hat.

Extra heavy plate, can be cleaned and kept bright with a few drops of ammonia.

Made of aluminum; seamless, die-cast construction.

Capacity, 2 hours; charge 1½ ounces.

Height, 3½ inches. Diameter cup, 2 inches; thickness rim, $\frac{3}{16}$ inch. Thickness walls, $\frac{1}{16}$ inch, exclusive of ribs.

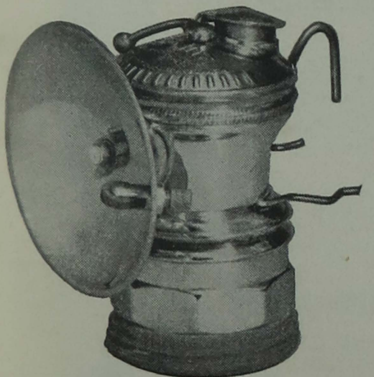
No. 25 cap clasp included with No. 4 round hook lamps. No. 27 handy cleaning tool included with all lamps.

Weight, 6¼ ounces.

No. 4, with Round Hook and 2¼-Inch Aluminum Reflector	each	**$1.85**
No. 43-F, with Flat Hook and 3-Inch Brass N.P. Reflector	each	**2.00**

Universal Auto-Lite Miners' Acetylene Cap Lamps

With Bumpergrip



Bumpergrip feature prevents breaking or denting bottom when striking to break up sludge; provides excellent gripping device for removing bottom; provides a cool grip when bottom is hot; preserves bottom so that it lasts as long as lamp.

Auto-lite features self-cleaning ball dropper; non-leakable water lid; one-piece unbreakable burner tube; Sturdibilt reflector; maximum water and carbide capacity; reinforced inner thread; seamless bottom carbide container. Polished brass finish.

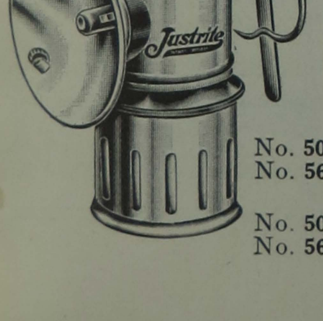
Packed one dozen in folding box, 3 dozen in carton.

Weight, 20 pounds per carton.

No. 106, 2½-In. Reflector	each	**$1.00**
No. 103, 3-In. Reflector	each	**1.00**
No. 110, 3-In. Reflector, Flat Hook	each	**1.00**

Justrite Metal Miners' Lamps

With Lighter Attachment



Constructed with a removable and automatic water feed. Valve stem can be removed and cleaned—light will not go out. With flame protector.

Diameter of reflector, 4 in.; burning capacity, 8 hours; charge, 8 ounces of carbide; height, 6in.; height to top of bail, 8 in.; diameter of bottom, 2⅞ in.; weight, 20 ounces.

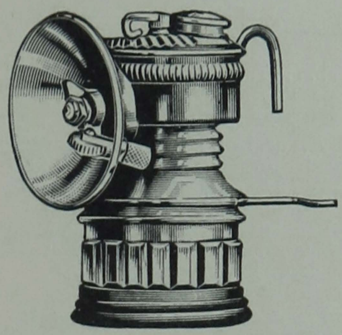
Steel

No. 50-D, with Bail & Hook	ea	**$3.25**
No. 56-D, with Folding Handles	ea.	**3.00**

Brass

No. 50-E, with Bail & Hook	ea	**$3.50**
No. 56-E, with Folding Handles	ea.	**3.25**

No. 285 Guy Dropper Carbide Lamps



This carbide lamp has a patented valve cleaner, a sturdy burner tube assembly, and a double seamed water cup and screw cap. The wire brace is detachable; the 2½-inch diameter nickel-plated reflector is fastened to the lamp with a wing nut. The lamp has lasting imported lava tips; the prong lid drains to prevent spouting.

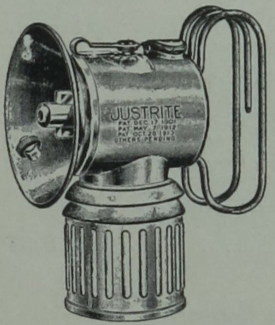
Length of burning time, 3 to 5 hours.

Height of lamp, 3½ inches.

Approximate weight each. 6 ounces.

No. **285**....................................each **$1.00**

No. 95 Justrite Superintendent's Lamps



No. 95 Justrite Superintendent's Lamp is of brass, non-magnetic, nickel plated.

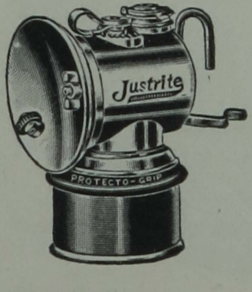
Height, 4¾ inches, burning capacity, 4 hours, 3-inch reflector with lighter attachment and flame protector.

Weight, 7 ounces.

No. **95**...............each **$2.00**

No. 787 Justrite Special Drivers' Lamps

Polygon Feed



Especially designed for drivers, motormen, engineers, timbermen and shotfirers for use in places subject to strong air currents.

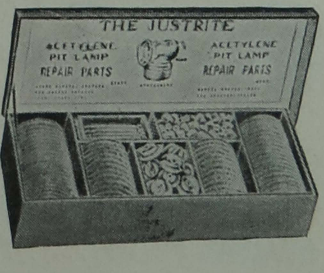
Has extra deep concaved nickel silver reflector, 2⅝ inches in diameter. Exterior finish polished brass. Round hook.

Equipped with No. 180 flame protector, making the lamp wind and water proof.

No. **787**....................................each **$1.25**

No. 2 Justrite Repair Outfits

For Carbide Lamps


THE JUSTRITE
ACETYLENE PIT LAMP REPAIR PARTS
ACETYLENE PIT LAMP REPAIR PARTS

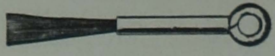
Packed in heavy cardboard box covered with waterproof paper, reinforced corners. Set consists of the following:

3 Dozen No. 60 Gaskets.
3 " " 62 Felts.
½ " " 64 Felt Holders.
2 " " 66 Lava Tips.
2 " " 28 Jewel Burner Tips.
2 Dozen No. 172 Flints.
1 " " 173 Springs.
1 " " 174 Screw Caps.
1 " " 182 Hexagon Nut.
¼ Dozen No. 177 Lighters, Complete.
1 Dozen No. 37 Tip Cleaners.

Price, No. **2**...................................each **$3.00**

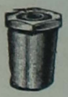
Repair Parts for Justrite Lamps

No. 22 Wire Tip Cleaners



No. **22**..each **$.05**

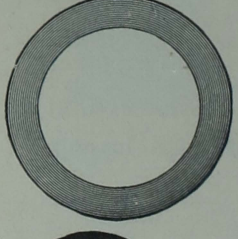
No. 28 Jewel Burner Tips



Shell made of brass with an imported Lava burner insert, combining the best qualities of the metal and Lava tip. Cannot break or crack. Easy to put in and take out.

No. **28**.................................each **$.05**

Rubber Gaskets

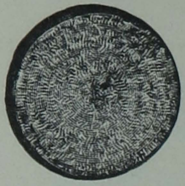


No. 60 gasket is for use on Justrite cap lamps.

No. 61 gasket is for use on Justrite Metal Miners' Lamps.

No. **60**..................each **$.05**
No. **61**..................each **.05**

Felts

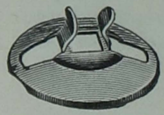


No. 62 is for use on Justrite cap lamps.

No. 52 is for use on Justrite Metal Miners' Lamps.

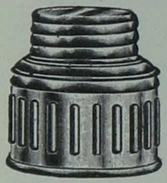
No. **62**.........................each **$.05**
No. **52**.........................each **.05**

No. 64 Felt Holders



No. **64**..........................each **$.05**

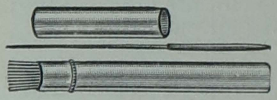
No. 69 Polished Brass Bottoms



The seam at base of bottom has 5 layers of metal rolled together. Solder is then forced into the crevices from the inside forming a solid rim ⅛-inch thick. The upper part, including the screw threads with rolled edge, is 1-piece drawn from seamless brass supported by beaded edge.

No. **69**.......................each **$.35**

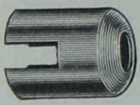
Tip Reamers



Packed 1 dozen in reamer case.

No. **145**.............each **$.05**
No. **150**, Reamer Case Only.............each **.05**

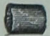
Flame Protectors



No. 180 is for all detachable reflector lamps; No. 170 for all permanent reflector lamps.

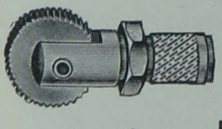
No. **180**.........................each **$.10**
No. **170**.........................each **.10**

No. 172 Flints



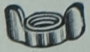
No. **172**...........................each **$.05**

No. 177 Lighters



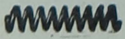
No. **177**, Complete...........each **$.10**

No. 197 Wing Nuts



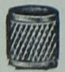
No. **197**..........................each **$.05**

No. 173 Springs



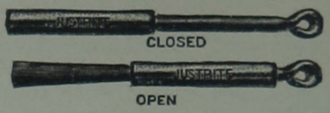
No. **173**.........................each **$.05**

No. 174 Screw Caps



No. **174**...........................each **$.05**

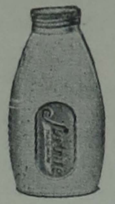
No. 37 Justrite Wire Tip Cleaners



Has 50 hard rustproof steel wires and sliding cover. Wires are protected when not in use.

No. **37**................................per dozen **$.75**

Justrite Carbide Flasks



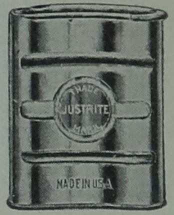
Made of heavy tin, double seamed, strong, durable.

Oval shape, size 6¾x2x3 inches.

Has large opening and empties freely.

Price, No. **23**, with Screw Cap.......... **$.15**

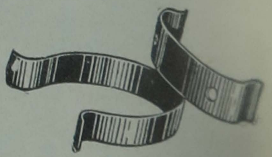
Justrite Carbide Cans


MADE JUSTRITE IN U.S.A.
MADE IN U.S.A.

Made of light steel, tin coated, ribbed, double seamed and sliding cover, air tight, concaved to fit the boot or hip pocket. Holds full day's supply. Strong and durable. The most convenient and safest carbide supply can on the market. Will not rust.

No.	Description	Price Each
77	Capacity, 10 Ounces Carbide................	$.15

No. 65 Justrite Lamp Clips

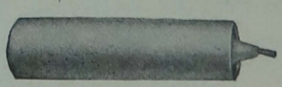


A black enameled steel clip for holding cap lamps in rigid position. Can be easily attached to miner's cap or hat.

Packed 1 dozen in a box, 1 gross in a carton. Shipping weight per dozen, ½ pound.

Price, No. **65**..............................each **$.10**

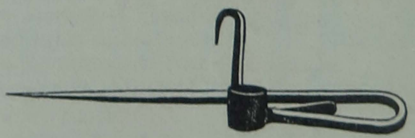
Granite Miners' Candles



Length, 6 inches; 6 candles in a set. Weight per set, 14 ounces. Packed 40 sets in a case, in layers.

Prices upon application.

Miners' Candlesticks



Furnished in 5, 6½ and 7 inches, measuring from hook to point. Packed one dozen in a box.

Prices upon application.

Generator Carbide

A manufactured gas-producing substance. Will not burn or explode and in original package will keep for years. When brought in contact with water in any standard generator it generates acetylene for lighting fuel, welding, etc. Sizes: 1¼x⅜ inches, ¼x1/12 inches, rice and ND.

Packed in substantial steel drums. Weight, 107 pounds.

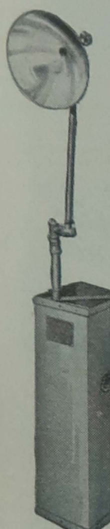
Miners' Lamp Carbide

Selected for correct uniform size, high gas yield and freedom from dust.

Packed in substantial steel drums, 100 pounds weight, also in 25, 10 and 2-pound cans.

Prices upon application.

No. 21-9 Milburn Portable Carbide Lights



Constructed to use commercial lump carbide.

Uses 8000-c.p. burner with automatic burner cleaner and shut-off valve.

Reflector combines wide range for large area lighting and focus for distance.

Swing joints enable light to swivel in horizontal or vertical position. Reflector may be turned down against side of light for storage.

Approved by Underwriters' Laboratories.

No.		21–9
Each		**$48.00**
Lump Carbide Charge	pounds	10
Size Carbide	inches	1¼x⅜
Burning Capacity	hours	10–12
Burner Size		71
Height	feet	6
Tank Size	inches	10x10x36
Reflector	inches	15
Weight, Empty	pounds	50
Shipping Weight	pounds	80

No. 20 Carbic Floodlight Cakes

Can be used in carbic lights Nos. 2 and 3.

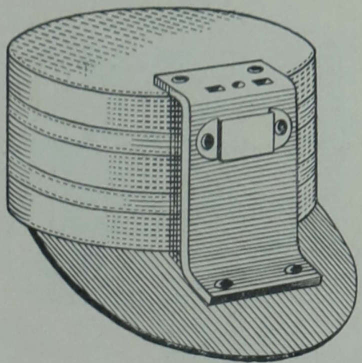
Made from high grade calcium carbide, treated and compressed into briquet form by special process.

Packed 40 cakes in sheet steel drum.

No. 20..per drum **$5.65**

Our Contractors Equipment Department has a solution for your construction problem.

No. 421 Penn Miners' Brown Pit Caps



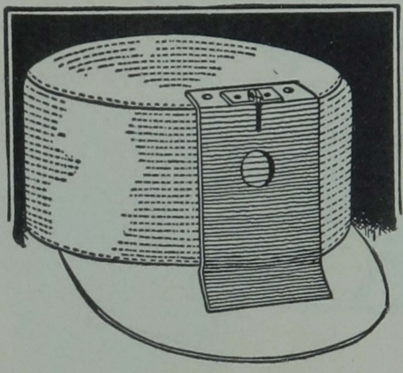
Made of heavy waterproof shrunken duck, flannel lined. Finished with 2 extra bands on outside.

Visor is of heavy sole leather 3 inches wide.

The lamp support is also made of heavy sole leather, and is equipped for carrying any electric lamp exactly right.

No. **421**..per dozen **$5.80**

No. 37 Coal Miners' Caps

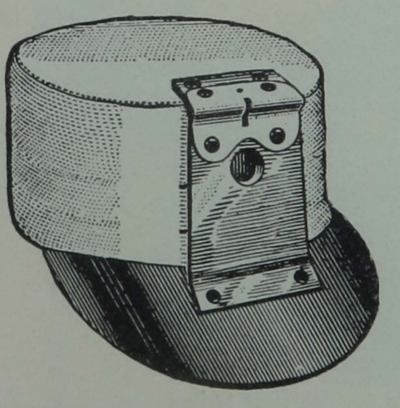


Made of special waterproof shrunken duck, lined throughout with flannel. Visor is of heavy sole leather, 2¾ inches in width.

Lamp support is of heavy sole leather, with the Barta patented holder to hold any carbide lamp secure and permanent.

No. **37**..per dozen **$5.10**

No. L800 Penn Miners' Brown Pit Caps



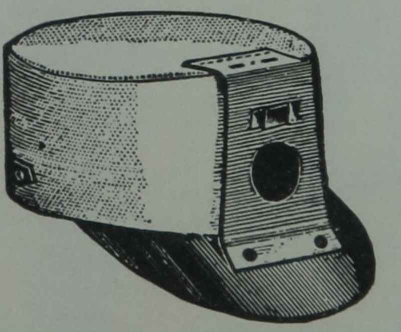
Made of heavy weight special shrunk duck, flannel lined.

Visor is of a heavy sole leather, 2½ inches in width.

The lamp-holder is made of sole leather, with a metal top-piece for carrying the lamp.

No. **L800**......................................per dozen **$4.30**

No. 151-12 Penco Miners' Brown Pit Caps



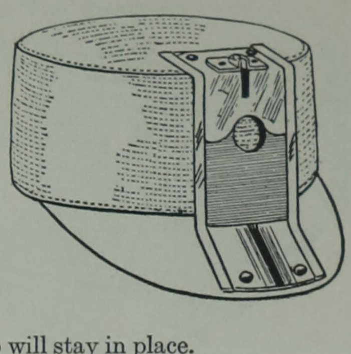
Made for carrying electric lamps in mines that are electrically equipped. Made of special waterproof shrunken duck, flannel lined. Visor is made of selected heavy sole leather 2¾ inches wide. Has a leather fastener on back of cap for carrying electric wire from battery to lamp.

Lamp holder is made of extra heavy sole leather and is equipped to carry various makes of electric lamp, securely sewed to cap with double lock stitch.

Can be furnished with fixture riveted on if desired.

No. **151–12**....................................per dozen **$4.30**

No. 27 Coal Miners' Caps

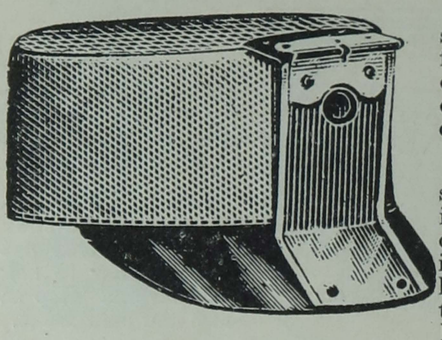


Made of special waterproof shrunken duck. Lined with flannel. Visor is made of heavy material, covered with waterproof duck, and will not be affected by water or dampness.

The Barta lamp support is of 2X tin, interlined with vulcanized fibre, making it strong, and arranged in such a manner as to carry any carbide lamp correctly; lamp will stay in place.

Price, No. **27**............................per gross **$3.00**

No. 97 Coal Miners' Caps

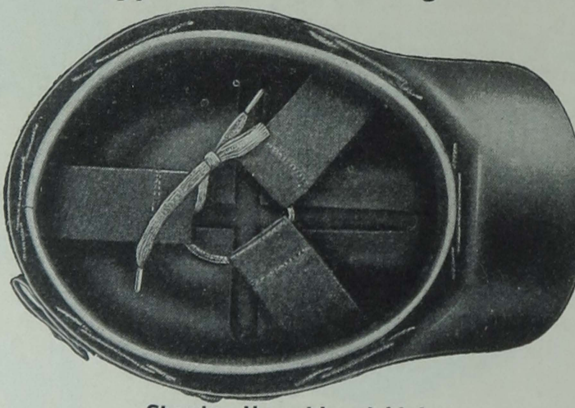


Made of special shrunk white duck, flannel lined. Visor is of heavy material covered with white duck.

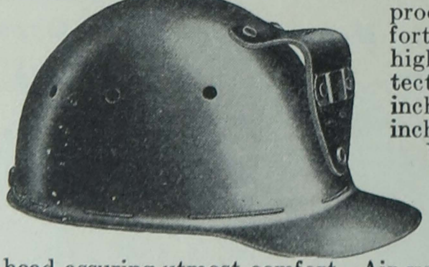
Lamp-holder is constructed of 2X tin, interlined with vulcanized fibre, making it durable. Lampholder adapted for the carrying of acetylene lamps.

Price, No. **97**.................   ....per gross **$2.20**

Type D M.S.A. Skullgards



Showing Uncushioned Lining

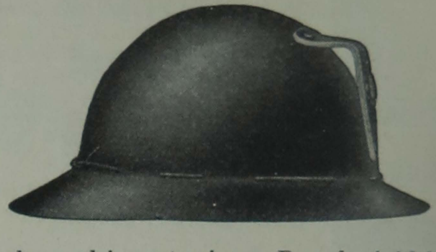


Madefrom black waterproof Micarta, offers comfortable light weight, highly efficient head protection. Available in ⅛-inch sizes from 6 to 8 inches inclusive.

Uncushioned lining is standard in Type D. Pliable sweatband conforms readily to shape of head assuring utmost comfort. Air vents in crown and free air space around sweatband afford maximum ventilation without harmful drafts. Three-piece adjustable crown hammock provides exceptional shock protection.

Type D with Leatherette Sweatband...........each	**$2.00**
Type D with Genuine Leather Sweatband.......each	**2.20**
Extra Uncushioned Linings, Complete, Including Leatherette Band, Cradle Straps and Laces...each	**.40**
Extra Uncushioned Linings, Complete, Including Genuine Leather Band, Cradle Straps and Laces..each	**.60**

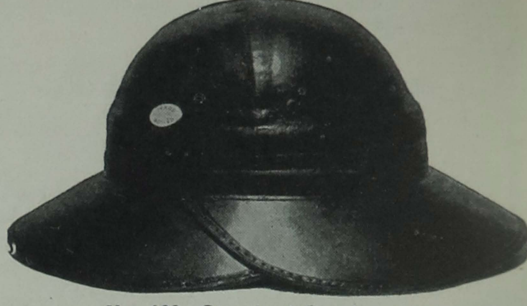
Type K M.S.A. Doughboy Model Skullgards



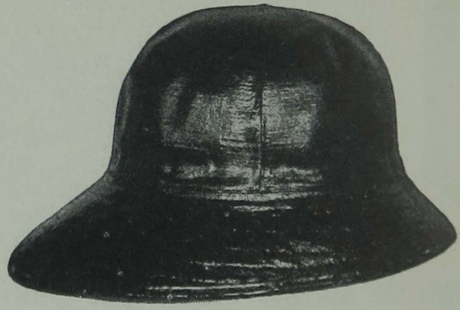
Extensively used in wet mines. Broad, rigid brim sheds water and protects against falling objects as well. Available in ⅛ sizes from 6 to 8 inclusive. Equipped with genuine leather sweatband.

Type K with Lamp Bracket (as illustrated).....each	**$3.50**
Type K without Lamp Bracket.................each	**3.40**
Extra Genuine Leather Sweatband..............each	**.65**

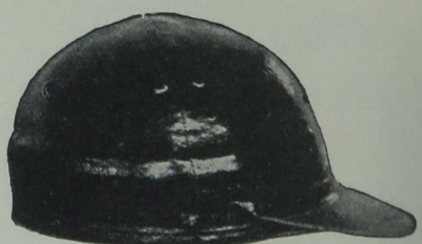
Bullard Hard-Boiled Hats



No. 122—Standard Southwester



No. 125—Slicker Model—Yellow or Black



No. 127—Cap

Made of blow resistant material. Resists fire and electric current. An object striking hat will first dent resilient crown. Free air space. Ventilating holes; raised lips exclude water. Adjustable draw string fits hammock to head. Protective brim. Felt inner padding. Strong, web hammock straps built into hat. Sweat-proof hat band.

Usually furnished with lamp brackets.

Please specify whether wanted with or without brackets when ordering.

No. **122**, Std. Southwester, with Lamp Bracket..each	**$2.20**
No. **122** Std. Southwester, without Lamp Bracket.ea.	**2.10**
No. **125**, Slicker Model Black or Yellow, with Lamp Bracket....................................each	**2.20**
No. **125**, Slicker Model, Black or Yellow, without Lamp Bracket..............................each	**2.10**
No. **127**, Cap with Lamp Bracket...............each	**2.15**
No. **127**, Cap without Lamp Bracket...........each	**2.05**

Snyder Rubber Coats and Overall Pants

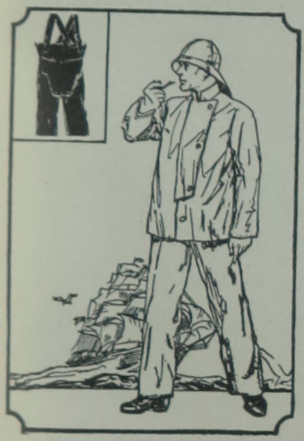
For miners and firemen. Heavy, black rubber, double coated fabric, fly front, snap fasteners and D rings. An outside drain hole on sleeve near cuff, pure rubber sleeves inside and adjustable straps at wrists. Ventilation holes under armpits. Drain hole at base of pocket. Back is ventilated and has a second piece of material over it. Shoulder seams have a strip over them; extra patch is cemented on the elbows. Rubber surfaced collar is standard equipment but corduroy may be had at same cost, to order.

Furnished in sizes 36, 38, 40, 42, 44 and 46.

The overall pants have shoulder straps and are furnished in sizes 36, 38, 40, 42, 44 and 46.

Coats, 38-Inch Length	each	**$6.00**
Coats, 48-Inch Length	each	**7.00**
Overall Pants	each	**6.00**

Snyder Oilskin Slicker Jackets and Overall Pants



The slicker jackets are furnished in sizes No. 0 (44–46), No. 1 (40–42), and No. 2 (36–38).

The slicker overall pants are made with shoulder straps. Furnished in sizes No. 0 (44–46), No. 1 (40–42) and No. 2 (36–38).

Jackets	each	**$1.60**
Overall Pants	each	**1.60**

Snyder Heavy Red Rubber Acid Gloves

Molded, all rubber, steam cured.

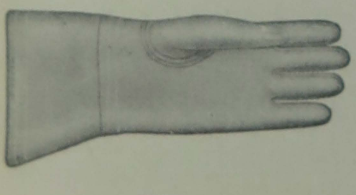
Not easily torn or punctured.

For handling acids and other corrosive materials.

Furnished in sizes 9½, 10 or 10½.

Per Pair... **$1.90**

Snyder Heavy White Rubber Gloves



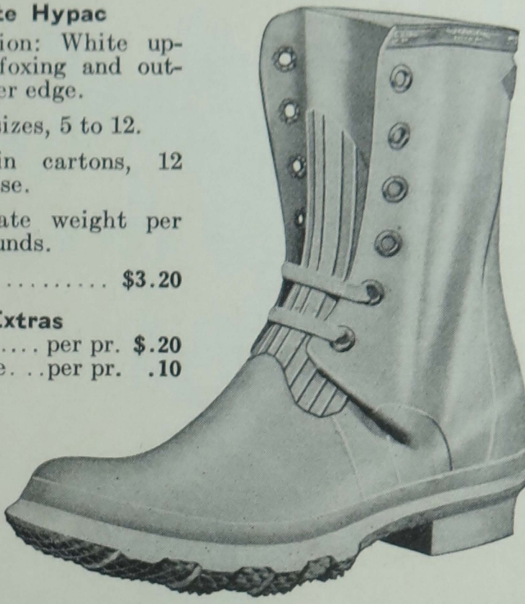
A 5-inch gauntlet. Cloth reinforced for use in handling dangerous chemicals such as cyanide or acid.

Furnished in size 15 only.

Per Pair.......... **$3.00**

Rubber Boots

White Hypac



Construction: White upper, white foxing and outsole. Bumper edge.

In men's sizes, 5 to 12.

Packed in cartons, 12 pairs in a case.

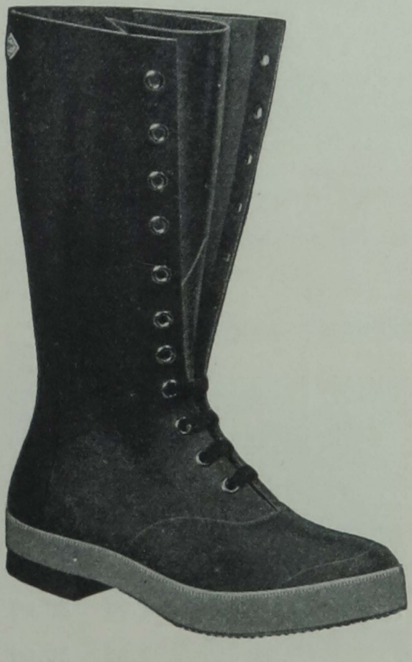
Approximate weight per pair, 4¼ pounds.

Per Pair............. **$3.20**

Extras

Safety Toe	per pr.	**$.20**
Cleated Sole	per pr.	**.10**

Deerfoot



Construction: Black upper, grey outsole, black heel, cushion insole, velvet finish, fleece lined.

Height, 15 inches; width, wide.

In men's sizes, 6 to 12.

Packed in cartons, 12 pairs in a case.

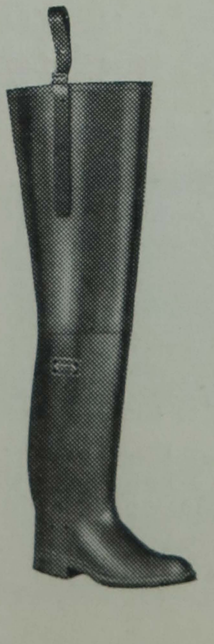
Approximate weight per pair, 5 pounds and 6 ounces.

Per Pair...... **$4.10**

Extras

Cleated Sole ....per pr. **$.10**

Lextro Molded



Made under Lectro Process Molded Footwear patents.

Construction: Tan upper, outsole, and heel. Knit lined, natural finish. All rubber molded top.

Men's sizes 6 to 12, short, storm king, or sporting.

Packed 6 pairs to a case.

Approximate weight per pair, 8 pounds.

Can be had with safety toe.

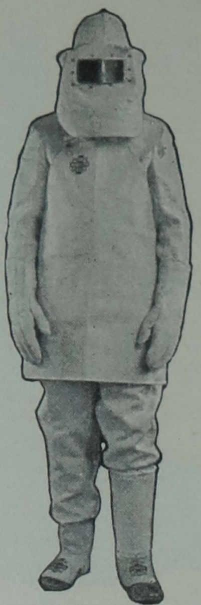
Prices upon application.

Short	per pr.	**$3.30**
Storm King	per pr.	**5.00**
Hip Boots	per pr.	**5.50**

Extras

Safety Toe	per pr.	**.20**

Wheeler Protective Apparel



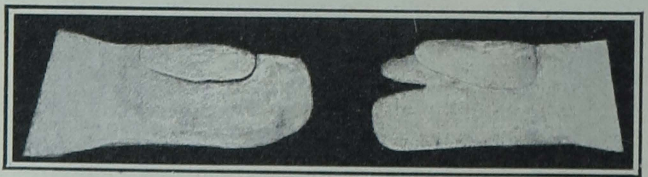
The need of protective apparel for workmen is no greater today than it has ever been, but the demand for protective apparel has increased a thousandfold. This is because plant executives have come to realize the economy of protecting their men against burns and accidents; and the added efficiency and increased output to be enjoyed by their so doing.

Design, fit and finish of this protective apparel is beyond reproach. All clothing is made to measure, so size must be specified when ordering.

Articles listed are staples, but anything desired in this line can be furnished.

No.	Description		Prices 1 to 11 Each	Prices In Doz. Lots
1200	Asbestos Pants	Specify sizes	$8.00	$80.00
1205	Asbestos Coats		8.80	88.00
1244	Asbestos Jumper Suit ...		15.00	150.00
1400	Fireproofed Duck Pants.		3.00	30.00
1405	Fireproofed Duck Coats.		3.30	33.00
1446	Fireproofed Jumper Suit		5.40	54.00
1000	Asbestos Helmet..................		6.30	63.00
1801	Asbestos Sleeves 13″ Long..per pair		1.20	12.00
1802	Fireproofed Duck Sleeves 13″ Long......per pair		.80	8.00
1803	Chrome Leather Sleeves 13″ Long .per pair		1.80	18.00
1600	Knee Pads, Chrome Leather, Leather Straps..................per pair		3.00	30.00
1601	Knee Pads, Chrome Leather, Elastic Straps.................per pair		3.00	30.00
1603	Knee Pads, Chrome Leather, Small Size.....................per pair		2.40	24.00
1604	Knee Pads, Oak Tanned Leather ....per pair		2.10	21.00
1006	Duck Pant Guards............. "		.35	3.50

Asbestos Mittens



Style A Style B

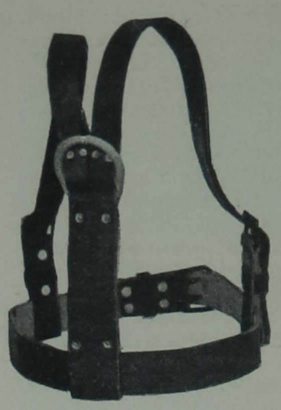
Used extensively by assayers and metal welders, and furnish efficient protection for those compelled to handle heated objects.

Made of the best asbestos cloth, reinforced on palm and thumb both front and back so that glove is interchangeable and lined with fleece lining. Can be made up to special specifications and in any lengths.

Regular lengths 12, 14 and 18 inches.

Prices upon application.

Bullard Leather Safety Belts

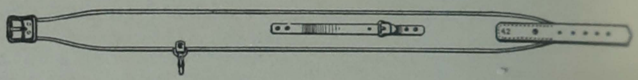


Made of high grade leather. D rings, snaps and buckles are all drop forged.

No. B-3 has non-sparking hardware throughout.

No. B-4, Complete without Life Line....each	$7.50
No. B-3, Complete without Life Line....each	12.50
No. B-8, 25-Ft. Life Line, Spliced on.......each	3.00
No. B-9, 50-Ft. Life Line, Spliced on.......each	5.50

Miners' Leather Belts

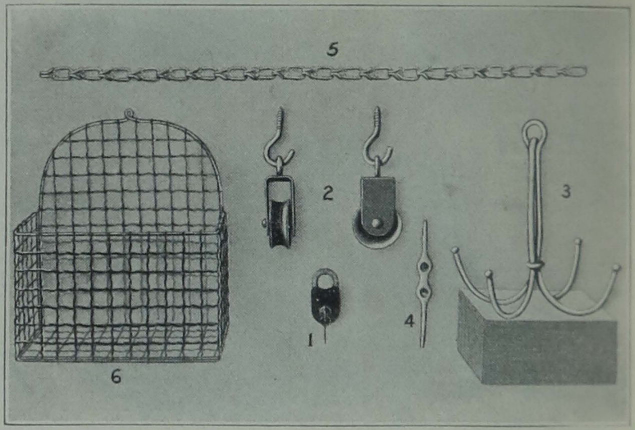


Two-piece black leather 3 inches wide, with check snap, for electric battery.

Sizes: 32, 34, 36, 38, 40, 42 and 44 inches.

Each...$1.00

Union Sanitary Clothes Hangers



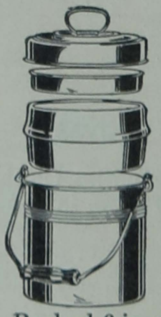
This hanger is designed to be absolutely sanitary and to prevent sickness and disease. Rustproof, foolproof and sturdy. Withstands the roughest usage.

A set consists of the following:

Wire Basket, Size 8x6x5 Inches................	each	$.50
4-Prong Clothes Hook..........................	each	.35
Cleat..	each	.05
2 Pulleys......................................	each	.30
30 Feet of No. 1 U.L.L. Chain..................	each	.90
Padlock..	each	.60
Complete Equipment.............................	each	3.00

No. 2856P Priscilla Round Aluminum Dinner Pails

Capacity, 6 Quarts



Made of heavy gage aluminum and is well constructed.

Highly polished, inside and bottom natural finish. Tightly rolled round beads.

Strong steel bail with ebonized grip. Inset fits snugly into pail and cover fits inset tightly so when cover is removed it lifts inset and tray with it.

Capacity pail, 6 quarts; top diameter, 8¼ inches; depth, 7½ inches.

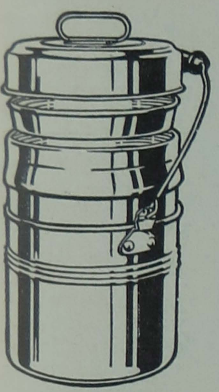
Capacity inset, 3 quarts; top diameter, 7⅝ inches; depth, 4½ inches.

Diameter pie plate, 7⅝ inches; depth, 1³⁄₁₆ inches.

Packed 6 in a case; weight per case, 19 pounds.

No. 2856P...............................per doz. $22.80

No. 7777-L Aluminum Dinner Pails



Specially constructed slip-over cover protects contents. Has tray and extra large bottom vessel for liquids.

Polished. Inset and tray bright natural. Imprinted Pure Aluminum. Labeled.

Gage, 24; capacity, 7½ quarts.

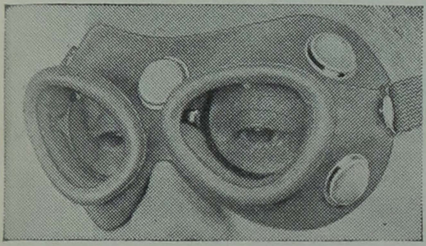
Packed ½ dozen in a case; 1 in a folding carton.

Shipping weight per dozen, 27 pounds.

No. 7777-L................each **$1.30**

Willson Rubber Mask Type Goggles

Indirect Ventilation



For chemical workers, for chipping, grinding, etc. Style X31 is used widely by chippers, riveters, grinders and others in dangerous eye-hazardous work and is equally suitable whether or not the workman wears spectacles.

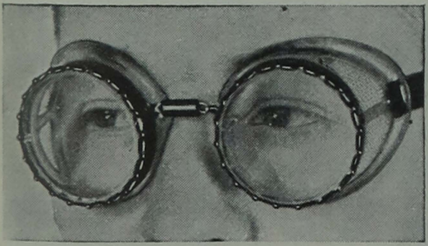
The triangular shaped Super-Tough lenses provide a wide range of vision and protection against impact. Adequate ventilation is provided through five ventilating ports which are screened to prevent entrance of dust. Two-piece adjustable elastic headbands.

Packed in a cardboard box.

Style X31, with Drop Eye Super-Tough Lenses	ea.	**$1.65**
Style X32, with Drop Eye Clear Unhardened Lenses	ea.	**1.30**
Style X33, with Drop Eye Laminated Lenses	ea.	**2.00**
Drop Eye Super-Tough Lenses	per pr.	**1.05**
Drop Eye Unhardened Lenses	per pr.	**.80**
Drop Eye Laminated Lenses	per pr.	**1.40**
Headbands	ea.	**.18**

Willson Heavy Duty Bull Dog Goggles

Direct Ventilation



Built to withstand hard service and punishment. For chipping, riveting, grinding, etc.

The anatomical shape of the cup is patterned after the bony structure of the orbital cavity, so that it matches the contour of most face shapes and sizes.

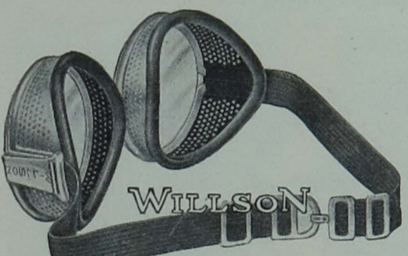
This goggle has 50 mm. clear Super-Tough lenses, metallic ventilated lens retaining rings, shock absorbing spacer ring, and adjustable elastic headband. When so specified all-rubber headband may be substituted for the elastic headband at no extra cost.

Packed in a cardboard box.

Style RR**50**, Brown Composition Cups	each	**$1.75**
Style RR**502**, Transparent Sonite Cups	each	**2.00**
50 mm. Super-Tough Lenses	per pr.	**.75**
Elastic Headband	each	**.12**
Metallic Lens Retaining Rings	per pr.	**.15**
Composition Lens Retaining Rings	per pr.	**.20**
Ventilating Lens Retaining Rings (Including Shock Absorbing Spacer Ring)	per pr.	**.20**

Willson Metal Cup Goggles

Direct Ventilation



For chipping, riveting, etc. Aluminum cups edged with sweat-proof padding; alumilited to resist corrosion. Adjustable elastic headband. Super-Tough lenses; Style LJ33½ has laminated lenses. Styles LJ50A and LJ31½A have cups of Ambrac non-corrosive material. Packed in metal case.

Style	LJ50	LJ50A	LJ31½	LJ31½A	LJ33½
Lenses..........mm	50	50	47.5	47.5	47.5
Each	**$1.65**	**$1.65**	**$1.50**	**$1.50**	**$1.70**
Extra Lenses.per pr.	**.75**	**.75**	**.65**	**.65**	**.75**
Headbands....each	**.12**	**.12**	**.12**	**.12**	**.12**

Willson Metal Cup Goggles

Indirect Ventilation

For chipping, riveting, grinding, etc.

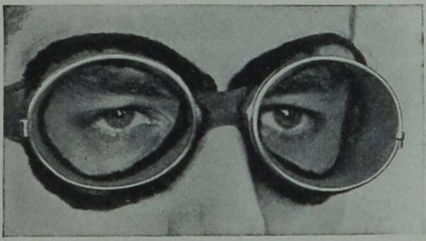
Has indirect ventilating ports to prevent the entrance of dust, hot metal, etc.

Metal cups; one-piece adjustable elastic headband.

Packed in metal case.

Style	LJ58½	LJ48½
Super-Tough Lenses..........mm.	50	47.5
Each	**$1.75**	**$1.60**
Extra Lenses..........per pr.	**.75**	**.65**
Headbands..........each	**.12**	**.12**

Willson Mask Type Dust Goggles



An unusually comfortable light weight dust goggle. Oval shaped lenses give wide vision and are easily replaceable.

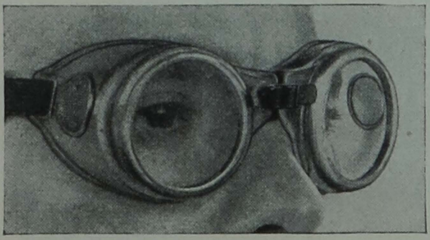
Fabric cups with chenille binding permit easy entrance of air with the exclusion of dust.

Adjustable elastic headband.

Packed 12 in a cardboard box.

Style D80, with Unhardened Clear Lenses	each	**$.80**
Style D81, with Super-Tough Lenses	each	**1.60**
Unhardened Lenses	per pr.	**.40**
Super-Tough Lenses	per pr.	**1.20**

Style CC502 Willson Cover-All Goggles



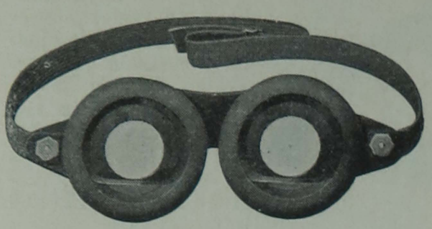
This composition cup, all-purpose cover-all goggle, made of transparent Sonite, obtains for the wearer a wholly normal eye condition, the "blinder" feeling being entirely eliminated.

Shaped to fit the curves of the face and fitted with 50 mm. Super-Tough lenses, the roomy well-ventilated cups serve equally well for regular and over-spectacle use.

Style CC12 is identical with Style CC502 except that it is fitted with 45.8 mm. Super-Tough lenses.

Style CC502 Packed in Cardboard Box	each	**$2.50**
Style CC12 Packed in Cardboard Box	each	**2.00**

Cover's Nod and Shake Gas-Tight Rubber Goggles



Used in hazardous places.

Put some water in chambers as shown in illustration. The natural movements of the body wash glasses clear of moisture, but should any gather, "nod and shake head" and fogging is eliminated. Water will not spill out.

Per Dozen.. **$18.00**

Style B501 Willson Light Weight Spectacle Type Goggles

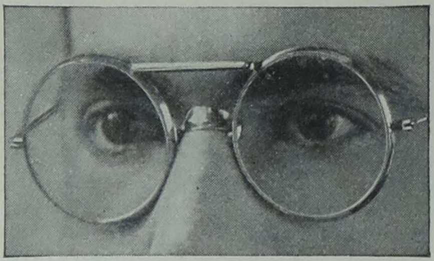
Recommended for light duty work where only frontal protection is required, such as light grinding, wire spinning, spot welding, wood working, etc.

Lenses are 50 mm. plain thick, clear unhardened glass, and give protection only on operations where severe impact is not encountered.

Has industrial cable temples. Packed in a cardboard box.

Style B501	each	**$.75**
50 mm. Flat, Clear, Unhardened Lenses	per pr.	**.35**
Temples	per pr.	**.15**

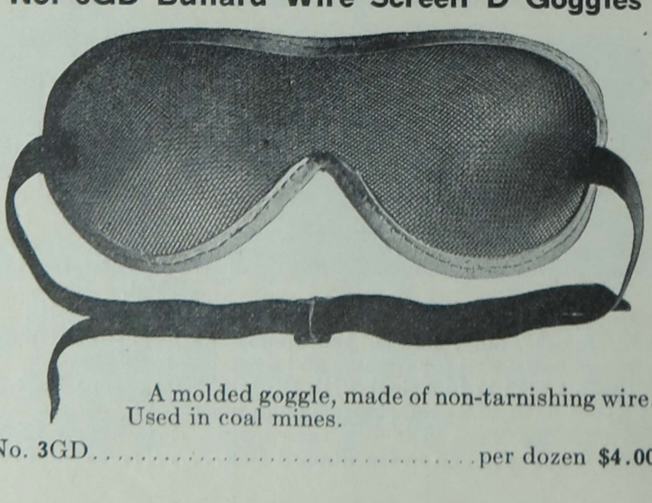
Willson Safety Goggles



Designed in three bridge widths for front protection only. Made of metal with Super-Tough glass lenses. Has reinforcing bar across top and covered cable earbows.

No. **B121**, with 52 MM. Lenses	each	**$1.35**
No. **B119**, with 50 MM. Lenses	each	**1.25**
No. **B117**, with 47½ MM. Lenses	each	**1.15**

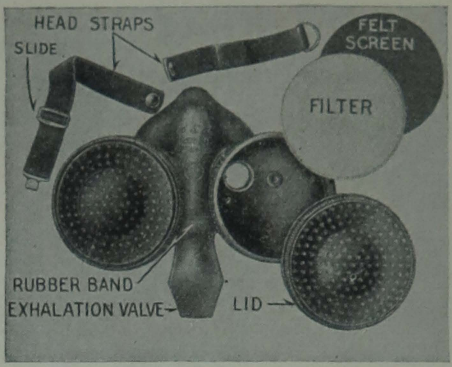
No. 3GD Bullard Wire Screen D Goggles



A molded goggle, made of non-tarnishing wire. Used in coal mines.

No. 3GD.................................per dozen **$4.00**

M.S.A. Comfo Respirators



Has twin side-placed filters with large filtering area.

Filtering medium consists of a cellulose filter and a felt screen.

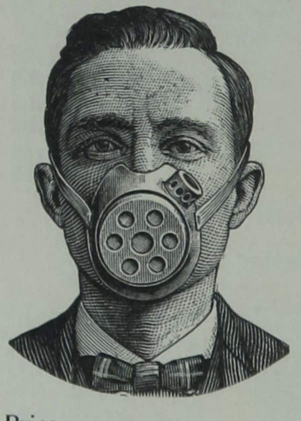
Position of filters, as well as head straps, assures non-interference with vision and working freedom, and allows wearing of spectacles, goggles, welding helmets or head coverings of any kind. Soft, flexible, inturned edge of face piece assures a comfortable fit and air-tight seal.

Aluminum filter cases and rubber face piece may be washed and disinfected at any time without risk of corroding metal. Changing of filters further contributes to sanitary standards where respirators are used interchangeably by workmen. Cellulose filter discs may be renewed when necessary.

Lead dust filter discs and Type AC dust and mist filter discs are identical in size, and may be used in any respirator. The same felt screens are used with both types of cellulose filter discs.

No. **CR-8393**, Dust and Mist, with 10 Extra Filters	each	**$2.25**
No. **CR-9257**, Lead Dust, with 10 Extra Filters	each	**2.25**
No. **CR-8528**, Cellulose Filter Disc for Dust and Mist Respirator	per pkg. of 10	**.25**
No. **CR-9258**, Cellulose Filter Discs for Lead Dust Respirator	per pkg. of 10	**.25**
No. **CR-8768**, Felt Screens	per pkg. of 10	**.35**

Automatic Rubber Respirators

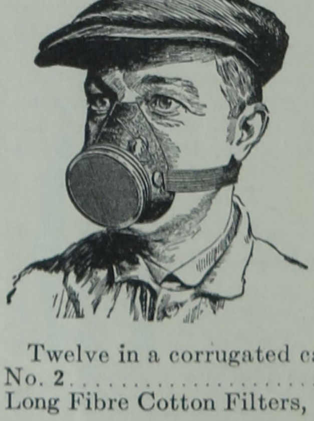


Provided with a closed and protected automatic ventilating valve which operates under all conditions.

The respirator is made of best soft, white rubber and is provided with adjustable elastic bands to quickly attach it to the face.

Price..each **$2.00**

No. 2 Willson Dustite Respirators



This respirator protects the nose, throat, mouth and lungs. Employs long fibre cotton filters, packed 100 to box.

Indispensable when handling cement, fur, lime, drugs, fertilizer, dry inks, soap powders, ashes and for work in dusty rooms as well as dusty outside work. Worn by farmers when spraying or dusting trees and plants, threshing, etc.

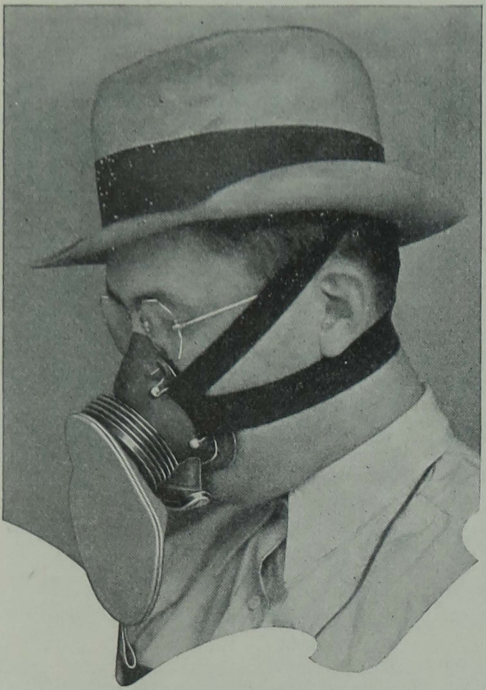
Packed in individual cartons; weight, 4½ ounces.

Six in a corrugated carton; weight, 35 ounces.

Twelve in a corrugated carton; weight, 65 ounces.

No. 2	each	**$1.50**
Long Fibre Cotton Filters, 100 to box	per box	**.75**

No. 4 Willson Approved Bag Respirators



This is a scientifically developed respirator with a single-ply long life filter bag. It is approved by the U. S. Bureau of Mines for protection against the inhalation of pneumoconiosis-producing dusts as encountered in industry.

The very large filtering area of this light weight respirator (40 square inches) offers exceedingly low breathing resistance and permits easy breathing and full comfort.

All parts are easily and economically replaceable. The Willson approved long life filters last in most cases as long as the respirator itself. A blast of compressed air played into the bag several times weekly, keeps it effectively clean.

Rebreathing of used air is prevented by an inhalation valve directly in the path of incoming air which closes the moment exhalation starts, insuring exit of exhaled air through a properly placed exhaust valve. Fatigue due to rebreathing exhaled air (because of its high carbon dioxide content) is definitely eliminated; also this used air which contains a great deal of moisture cannot go back to foul the filter.

This respirator can also be furnished with approved flutter type exhalation valve if specified.

No. **4**......................................each **$3.25**

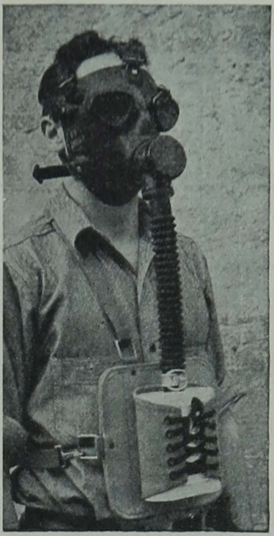
Willson Fume and Smoke Masks

Provide more comfort in irritating breathing conditions encountered when spraying lacquer, fighting fires, etc.

Each mask is designated by the number of cartridge used. No. 1 cartridge is an absorbent for organic fumes; No. 2 is for neutralizing mild acid fumes; No. 3 is a combined absorbent and neutralizer. None of these cartridges should be used in the presence of carbon monoxide, nitrous oxide or hydrogen sulphide fumes. Mask is packed in metal box with 2 extra cartridges and one pair of X63 goggles.

Nos. **1, 2** and **3** Fume and Smoke Masks	each	**$4.75**
Extra Cartridges, Box of 2	per box	**1.20**

Bullard C-M Canister Masks



GAS MASK
BULLARD
E. D. BULLARD COMPANY

Consists of Bullard one-piece molded facepiece, inhalation tube and connections, canister and carrying harness, complete in a strong weather-proof fibre carrying case.
Shipping weight, 8 pounds.

Complete Mask..............................each **$20.00**

C-M Canisters

Efficiency in absorption of gases is obtained where a specific gas or class of gases is to be met. In such case entire capacity of canister is taken up with one chemical absorbent. Following listing of canisters explains protective capacities of each. If a combination of gases is encountered some of which are acid gases and others organic vapors, canister CM-4 should be selected.

No. CM-**1**, Organic Vapors	each	**$2.50**
No. CM-**10**, Same and Smoke	each	**2.50**
No. CM-**2**, Acid Gases	each	**2.25**
No. CM-**20**, Same and Smoke	each	**2.25**
No. CM-**3**, Ammonia	each	**2.25**
No. CM-**30**, Same and Smoke	each	**2.25**
No. CM-**4**, Organic Vapors and Acid Gases	each	**2.50**
No. CM-**40**, Same and Smoke	each	**2.50**
No. CM-**7**, Hydrocyanic Acid	each	**2.25**
No. CM-**8**, Organic Vapors, Acid Gases and Ammonia	each	**2.40**
No. CM-**80**, Same and Smoke	each	**2.40**

Bullard Cylindrical First Aid Kits

A compact pocketed canvas roll which fits into a handy aluminum wall container. Roll is 8¾x25¼ inches unfolded; 12 unit treatments and instructions; size of container closed, 9x4 inches.

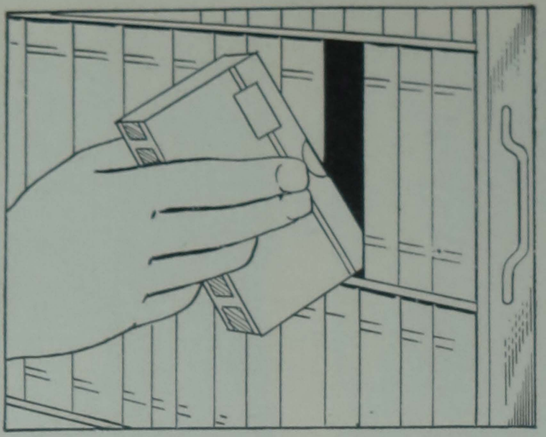
BULLARD
CYLINDRICAL
FIRST AID
KIT

Contents

1 Unit R1, 4-In. Bandage Compress
2 Unit R2, 2-In. Bandage Compress (4 per Unit)
1 Unit R36, 1-In. Adhesive Compress (16 per Unit)
1 Unit R5, Ammonia Inhalant (10 per Unit)
2 Unit R7, Triangular Bandage
1 Unit R8aR U.S. Army Tourniquet
1 Unit R47a Saf-T-Top Iodine or Mercurochrome
1 Pair Scissors
1 Pair Tweezers
1 Tube ½-Ounce Pyrol
Instruction Book.
Complete with roll and wall case.

Kit..............................each **$5.50**

First Aid Unit Packages for Kits



Unit No.	Per 100 Unit	Description	No. of Units Per Container	*Unit Size
R1	$18.00	4-Inch Bandage Compress	10	1
R2	28.80	2-Inch Bandage Compress (4 per Unit).	10	1
R3b	16.20	1-Inch Adhesive Compress (16 per Unit)	10	1
R4	45.00	Iodine Ampoules (10 per Unit)	10	1
R4M	45.00	Mercurochrome Ampoules (10 per Unit)	10	1
R5	34.80	Ammonia Inhalants (10 per Unit)	10	1
R6	36.00	Borated Petrolatum (6 per Unit)	10	1
R6B	36.00	Burn Ointment (6 per Unit)	10	1
R6c	36.00	Carbolated Ointment (6 per Unit)	10	1
R6K	36.00	Pyrol (6 per Unit)	10	1
R6s	36.00	Soda Bicarb. Ointment (6 per Unit)	10	1
R6t	72.00	Tannoin (4 per Unit)	10	1
R6U	36.00	Unguentine (6 per Unit)	10	1
R7	20.20	Triangular Bandage	10	1
R8	$42.00	Special Heavy Tourniquet	5	2
R8aR	25.90	U. S. Army Tourniquet	10	1
R8b	30.00	3½-inch Splinter Forcep	..	.
R8c	91.90	U. S. Army Tourniquet, Forceps and Scissors	5	2
R8R	55.90	Army Tourniquet and Forcep	5	2
R8S	36.00	4-inch Blunt-end Scissors	..	
R9	36.00	Wire Splint	10	1
R10	18.00	4-inch Bandage	10	1
R11	23.00	Gauze Bandage	10	1
R12	72.00	Eye Dressing Packet: Contents: 2-R12a 1-R12c 1-R12b Sol. 1-R12b 2-R12d 1-R12c Sol.	..	3
R14	6.00	Drinking Cups (10 per Unit)	10	1
R15	22.80	1-inch x 6-yard Compressed Roller Bandages (6 per Unit)	10	1
R16	20.40	2-inch x 6-yard Compressed Roller Bandages (3 per Unit)	10	1
R17	36.00	Picric Acid Ampoules (4 per Unit)	10	1
R18	36.00	Aromatic Ammonia (4 per Unit)	10	1
R20	36.00	Aromatic Ammonia (4 Vials)	10	1
R22	36.00	Poison Ivy Ointment (6 per Unit)	10	1
R31K	54.00	Pyrol 1-oz. (2 per Unit)	5	2
R33	36.00	Eye Dressing Packet (Small Size)	10	1
R34	28.80	½-Inch x 2½-Yard Adhesive Tape (2 per Unit)	10	1
R35	45.00	Iodine Swabs (10 per Unit)	10	1
R35M	45.00	Mercurochrome Swabs (10 per Unit)	10	1
R46	33.50	Mult-Aply Mercurochrome (2 per Unit)	10	1
R47	33.00	Mult-Aply Iodine (2 per Unit)	10	1
R48	64.80	Creosote Burn Sol. (4 per Unit)	10	1
R49	36.00	Mult-Aply Oil-of-Salt (2 per Unit)	10	1
R52	28.80	3-Inch Bandage Compress (2 per Unit).	10	1

*No. 1 size, ⅝ inch wide; No. 2 size, 1¼ inches wide; No. 3 size, 1⅞ inches wide. All units 4 inches long by 2⅛ inches deep.

Bullard First Aid Kits

No. 110

Suitable for 1 to 10 men. Size 8x4½x2½ inches.

No.	Contents	Qty.
*R1	4″ Bandage Compress	1
‡R2	2″ Bandage Compress	2
#R3B	1″ Adhesive Compress	2
†R46	Mult-Aply Iodine	1
¶R5	Ammonia Inhalants	1
§R6K	Pyrol	1
R11	Gauze Bandage	1
R8ar	U. S. Army Tourniquet	1

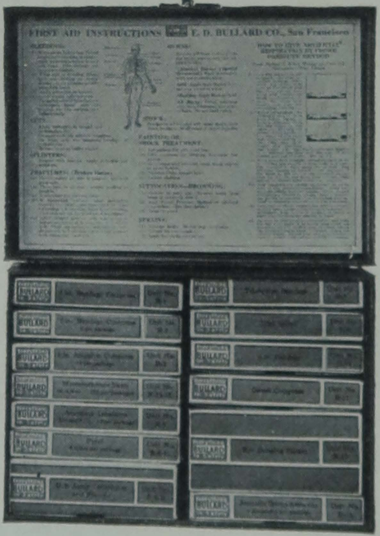
No. **110**, Shipping Weight, 3 Lbs.ea. **$3.98**

No. 160

Suitable for 36 to 60 men. Size 9¼x22x3 inches.

No.	Contents	Qty.
R1	4″ Bandage Compress	6
‡R2	2″ Bandage Compress	6
#R3B	1″ Adhesive Compress	4
†R46	Mult-Aply Iodine	4
¶R5	Ammonia Inhalants	2
§R6K	Pyrol	2
R7	Triangular Bandage	10
R8r	Army Tourniquet and Forcep	1
R10	4″ Bandage	6
R11	Gauze Bandage	6
R12	Eye Dressing Packet	1
†R31K	Pyrol, 2 Oz	3
¶R14	Drinking Cups	1
‡R18	Aromatic Ammonia	1
†R32	Sprain Bandage	1
.....	Yucca Splints	4

No. **160**, Shipping Weight, 12 Lbs. No. per Unit: *1; †2; ‡4; §6; ¶10; #16.ea.**$19.45**



No. 116

Suitable for 10 to 16 men. Size, 9x6¼x 2½ inches.

No.	Contents	Qty.
*R1	4″ Bandage Compress	1
‡R2	2″ Bandage Compress	2
#R3B	1″ Adhesive Compress	2
†R46	Mult-Aply Iodine	1
¶R5	Ammonia Inhalant	1
§R6K	Pyrol	1
*R8r	Tourniquet and Forceps	1
*R9	Wire Splint	1
*R10	4″ Bandage	1
*R11	Gauze Bandage	1
*R12	Eye Dressing Packet	1

No. **116**, Ship. Weight, 4½ Lbs.ea. **$5.89**

No. 124

Suitable for 16 to 24 men. Size, 9¼x9x 2½ inches.

No.	Contents	Qty.
*R1	4″ Bandage Compress	2
‡R2	2″ Bandage Compress	3
#R3B	1″ Adhesive Compress	3
†R46	Mult-Aply Iodine	2
¶R5	Ammonia Inhalant	1
§R6K	Pyrol	1
R7	Triangular Bandages	1
R8r	Tourniquet and Forceps	1
R9	Wire Splints	2
R10	4″ Bandage	2
R11	Gauze Compress	2
R12	Eye Dressing Outfit	1

No. **124**, Ship. Weight, 6 Lbs...ea. **$8.07**

No. 136

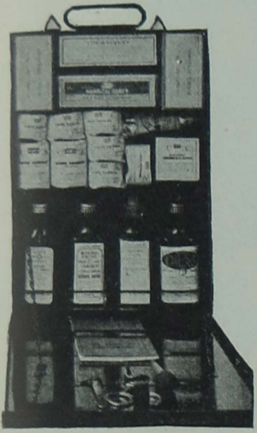
Suitable for 24 to 36 men. Size, 13x9¼x 2½ inches.

No.	Contents	Qty.
*R1	4″ Bandage Compress	3
‡R2	2″ Bandage Compress	3
#R3B	1″ Adhesive Compress	3
†R46	Mult-Aply Iodine	2
¶R5	Ammonia Inhalants	1
§R6K	Pyrol	1
*R7	Triangular Bandage, 40″	4
*R8r	Tourniquet and Forceps	1
*R9	Wire Splint	2
*R10	4″ Bandage	2
*R11	Gauze Compress	2
*R12	Eye Dressing Packet	1
¶R14	Drinking Cups	1
‡R18	Aromatic Spirits of Ammonia	1
†R31K	Burn Ointment	3

No. **136**, Ship. Weight, 9 Lbs. .ea. **$11.23**

Bullard Pacific First Aid Kits

No. 2



Constructed of heavy metal, finished in a green enamel inside and out.

Fasteners are attached for its use as a case to hang on wall.

Furnished with handle for carrying purposes.

Cover when open serves as a shelf for materials while being used.

Size, 12½x8½x2 inches.

Contents

6 Rolls 1″x10 Yd. Gauze Roller Bandage
2 Rolls 2″x10 Yd. Gauze Roller Bandage
2 Pkgs. ½-Oz. Absorbent Cotton
1 Pkg. 1″x5 Yd. ZO Adhesive Tape
1 Pkg. 1 Yd. Sterile Gauze
1 Pacific Tourniquet
1 Pair Scissors
1 Pair Tweezers
1 Medicine Dropper
2-Oz. Bottle Tincture of Iodine
2-Oz. Bottle Oil-of-Salt
2-Oz. Bottle Aromatic Ammonia
2-Oz. Bottle Boric Acid Solution
1-Oz. Tube Onol (Burn Ointment)
1 Pkg. R3 1″ Adhesive Compresses
1 First Aid Instruction Book

No. **2**, Shipping Weight, 5½ Pounds.............each **$6.40**

No. 6

Size, 17½x12½x3 inches.

Contents

8 Rolls 1″ x 10 Yd. Gauze Roller Bandages
3 Rolls 1½″ x 10 Yd. Gauze Roller Bandages
7 Rolls 2″ x 10 Yd. Gauze Roller Bandages
2 Rolls 2½″ x 10 Yd. Gauze Roller Bandages
1 Roll 1″ x 10 Yd. Adhesive Tape
1 Pkg. R3 1″ Adhesive Compresses
1 Jar Carbolated Petrolatum
1 Pacific Tourniquet
1 Pair Scissors
1 Pair Tweezers
1 Medicine Dropper
3 Yucca Splints
6 Size 6″x36″ Gauze Pads, Folded 3″x3″
2 Pkgs. 1 Yd. Surgical Gauze
5 Pkgs. ½-Oz. Absorbent Cotton
1 Bottle 4 Oz. Oil-of-Salt
1 Bottle 4 Oz. Aromatic Spirits of Ammonia
1 Bottle 4 Oz. Iodine
1 Bottle 4 Oz. Boric Acid Solution
1 First Aid Instruction Book

No. **6**, Shipping Weight, 11½ Pounds..........each **$10.40**

No. 10

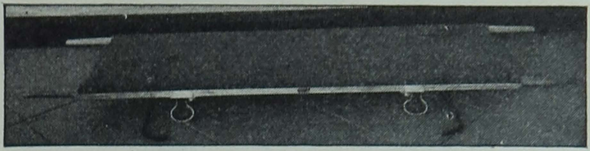
Designed primarily as an individual auto kit, also used in smaller plants and offices. Size, 8½x7¼x2 inches.

Contents

5 Rolls 1″x10 Yd. Gauze Roller Bandages
2 Rolls 2″x10 Yd. Gauze Roller Bandages
1 Pkg. ½-Oz. Absorbent Cotton
1 Pkg. R3 1″ Adhesive Compresses
1 Roll 1″x5 Yd. Adhesive Tape
1-Oz. Bottle Tincture of Iodine
1-Oz. Bottle Aromatic Spirits of Ammonia
1-Oz. Bottle Boric Acid Solution
½-Oz. Tube Onol (Burn Ointment)
1 Pacific Tourniquet
1 Pair Scissors
1 Pair Tweezers
1 Medicine Dropper
1 First Aid Instruction Book

No. **10**, Shipping Weight, 2½ Pounds...........each **$3.80**

Bullard Army Type Stretchers



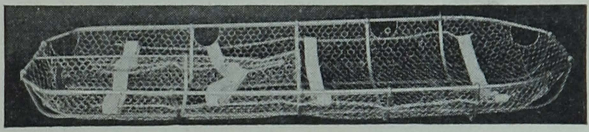
Made of 12-ounce double filled khaki attached to well-seasoned white ash posts. Forged steel folding braces; malleable iron feet.

Approved by medical department of U. S. Army. Canvas opens to size 6 feet long by 22 inches wide. By releasing braces, stretcher folds to over all length of 7½ feet, approximately 3½ inches in diameter.

Weight, 22½ pounds.

Each.. **$12.00**

Bullard Stokes Type Stretchers



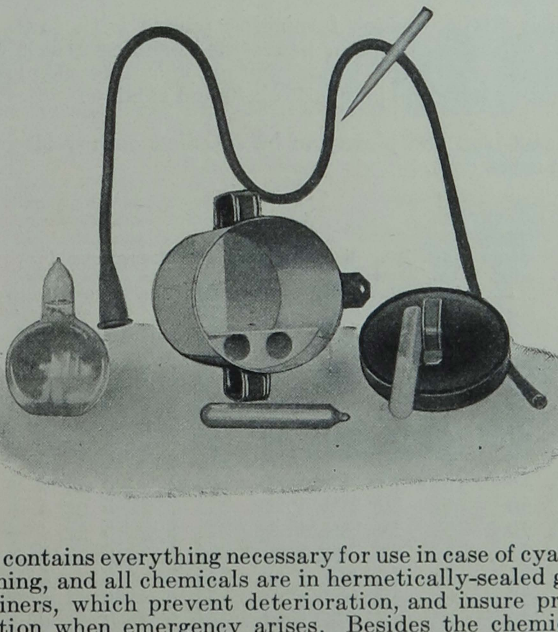
Made of heavy steel wire mesh with substantial steel frame and runners. Adjustable foot rests give accurate fit and complete protection from strains, bumps and blows. Particularly desirable where patient is to be carried up or down stairs or transported in a mine cage or skip. Webbing supports are provided. Stretcher may be used with or without splints.

Overall length, 6¾ feet; 22 inches inside diameter.

Weight, 27¼ pounds.

Each.. **$27.00**

No. 2236 Cyanide Poisoning Antidote Kits



Set contains everything necessary for use in case of cyanide poisoning, and all chemicals are in hermetically-sealed glass containers, which prevent deterioration, and insure proper condition when emergency arises. Besides the chemicals, which are made up in the correct proportions, there is a wooden gag, to be used to open the mouth in case the patient is unable to drink the antidote, and a stomach tube is run thru a hole in the gag and into the stomach; thus the antidote can be used most effectively.

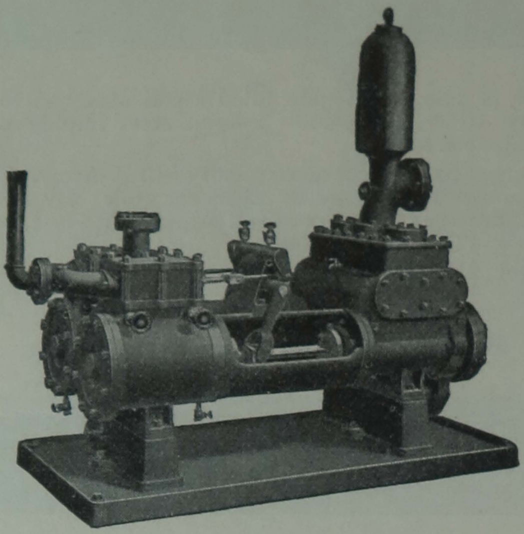
Parts are packed in a tin container, to be hung on a nail on the wall, and a label on the outside gives complete directions for use.

Approximate weight, 2½ pounds. Packed one set in a carton; shipping weight, 5 pounds.

No. **2236**..................................per set **$7.50**

Gardner-Denver Duplex Steam Pumps

For General Service
Packed Piston Type



These pumps are intended for service where the working pressure does not exceed 200 pounds on sizes 10x6x10 and smaller, and 175 pounds on the larger sizes.

The capacities, based on piston speed from 50 to 100 feet, can be very materially increased in case of fire emergencies.

Pumps Nos. 0 to 5 inclusive and Nos. 6A, 7, 8 and 9 are valve plate type, which are regularly furnished with brass inserted tube liners in the water cylinders. Pumps Nos. 6AA, 7AA, 8A, 9A and larger have cast-iron removable and interchangeable liners.

Brass fitting means furnishing pumps with brass-lined water cylinders, brass or brass-lined packing glands in the water ends, and Tobin bronze piston rods. Brass-lined glands are not included on pumps 10x6x10 and smaller.

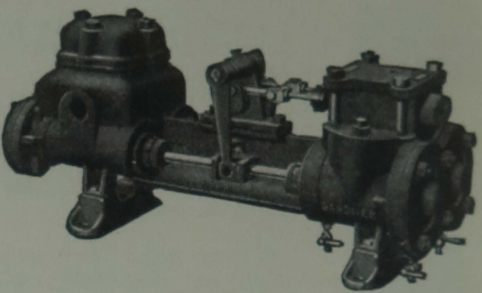
A cast-iron bed plate can be supplied on any size pump at an extra cost.

						Size Connections, In.				
No.	Diam. Steam Cyl. In.	Diam. Water Cyl. In.	Lgth. Stroke In.	Max. Water Pressure	Gal. per Stroke of One Piston	Steam	Exhaust	Suction	Discharge	Wt. Lbs.
0	2½	1½	3	200	.023	⅜	½	1	¾	110
00	3	2	3	200	.04	⅜	½	1¼	1	175
2	4½	3	4	200	.12	½	1	2	1½	350
3	5¼	3½	5	200	.21	¾	1¼	2½	2	500
4	6	4	6	200	.33	1	1½	3	2	635
5	7	4½	10	200	.69	1½	2	4	3	1100
6A	8	5	10	200	.85	1½	2	4	3	1650
6AA	8	5	10	200	.85	1½	2	5	4	2050
7	10	6	10	200	1.22	2	2½	5	4	1900
7AA	10	6	10	200	1.22	2	2½	5	4	2300
8	12	7	12	150	2.00	2½	3	6	5	3250
8A	12	7	12	175	2.00	2½	3	6	5	3700
9	12	8	12	150	2.61	2½	3	6	5	3470
9A	12	8	12	175	2.61	2½	3	7	6	4050
11	14	8	12	175	2.61	2½	3	7	6	4350
12	14	10	12	175	4.08	2½	3	8	7	5200
14	16	10	12	175	4.08	2½	4	8	7	5650
15	16	12	12	175	5.87	2½	4	10	8	7850
17	18	10	12	175	4.08	3	4	8	7	6650
18	18	12	12	175	5.87	3	4	10	8	8700
19	18	14	12	175	8.00	3	4	12	10	10400
20	20	12	12	175	5.87	4	5	10	8	8850
21	20	14	12	175	8.00	4	5	12	10	10600

Prices upon application.

Gardner-Denver Duplex General Service Packed Piston Pumps

Tube Lined Pattern



Size 4½x3x4

Pumps, 4-inch stroke and larger, are equipped with fork levers. These give double the wearing surface in the crossheads and are so arranged that the piston rods cannot turn. Pumps with steam cylinders 8 inches in diameter and larger are equipped with roller bearings in the crosshead which reduce friction and wear.

Unless otherwise specified brass valves are furnished on pumps up to and including the 7x4½x10; pumps larger than the 7x4½x10 are equipped with medium rubber valves.

Companion flanges furnished with all flanged openings.

Each pump is furnished with all necessary air and drain cocks, drip valves and plugs, spanners and a set of wrenches. Grease cups are put in the rocker shaft bearings.

Regular Fitted.—4½x3x4 and smaller pumps are regularly fitted with brass inserted tube liners and one-piece bronze piston rods. 5¼x3½x5 and larger pumps have brass inserted tube linings and one-piece steel rods. All pumps are furnished with water pistons packed but no other packing is included.

Brass Fitted.—6x4x6 and smaller are fitted with one-piece bronze piston rods. 7x4½x10 and larger have bronze rods on water end and steel rods on steam end; 12-inch stroke pumps are also provided with brass lined stuffing box glands on water end. Brass water pistons are not included in brass fittings but can be supplied at an extra cost; except the 4½x3x4 and smaller which are regularly furnished with brass pistons.

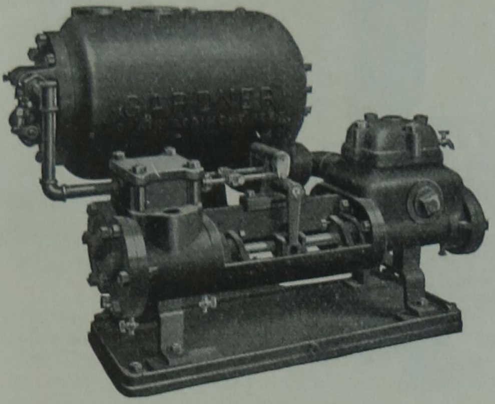
Bed plates, lubricator and other accessories supplied as extras and are not furnished unless especially ordered.

	Diam. Cylinder, Inches			*Pipe Connections, Inches			
No.	Steam	Water	Length Stroke Inches	Steam	Exhaust	Suction	Discharge
0	2½	1½	3	⅜	½	1	¾
00	3	2	3	⅜	½	1¼	1
2	4½	3	4	½	1	2	1½
3	5¼	3½	5	¾	1¼	2½	2
4	6	4	6	1	1½	3	2
5	7	4½	10	1½	2	4	3
6A	8	5	10	1½	2	4	3
7	10	6	10	2	2½	5	4
8	12	7	12	2½	3	6	5
9	12	8	12	2½	3	6	5

			Displacement				
			Normal		Maximum		
No.	Max. Water Pressure Lbs.	Gal. per Stroke of Each Piston	No. of Single Strokes of Each Piston	Gal. per Min.	No. of Single Strokes of Each Piston	Gal. per Min.	Approx. Ship. Wt. Lbs.
0	250	.023	100	4.5	200	9	110
00	250	.04	100	8	200	16	175
2	250	.12	100	24	200	48	350
3	250	.21	90	38	180	75	500
4	200	.33	90	59	180	118	635
5	200	.69	60	83	120	166	1100
6A	200	.85	60	100	120	200	1650
7	200	1.22	60	147	120	294	1900
8	150	2.00	50	200	100	400	3250
9	150	2.61	50	261	100	522	3470

*For short lengths; to be increased as length increases.
Prices upon application.

Gardner-Denver Automatic Feed Pumps and Receivers



For draining steam coils, radiators, heaters, drying cylinders, steam jackets, etc., and feeding the condensate into boilers.

This outfit should be located so that all returns will drain by gravity into the receiver. The receiving tank vent opening should be open while pump is in operation permitting atmospheric pressure in receiver. This unit is a liquid pump only and is not suitable for exhausting vapor from radiating systems.

The pump is automatic in its action, returning the water to the boiler as fast as it accumulates in the receiver. It can also be used to regulate brine circulation in refrigerating machinery and for other circulating purposes where automatic action is required.

The action of the pump is automatically controlled by a seamless copper float (tested to 300 pounds) within the receiver, dispensing with the use of cast iron bucket floats with counter weights and balanced valves.

The receiving tank is of large capacity and guaranteed and tested for 200 pounds. It is provided with a sediment compartment to catch the sediment and chips from return pipes, radiators, etc., which prevents foreign matter being drawn through the pump with disastrous results to valves, seats, linings, etc.

Each receiver has 2 openings in the top for returns; when more are required they can be connected into the end of the receiving tank. When used for feeding boilers, a small cold water supply should be introduced to make up for the loss that will naturally occur due to leaks in the piping and fittings.

No.	Each	Diam. of Steam Cyl. In.	Diam. of Water Cyl. In.	Length of Stroke In.	Max. Water Press. Lbs.	Min. Steam Press. for Boiler Feed. Lbs.	Strokes per Minute of Each Piston	Gal. per Minute	Boiler H.P. 34.5 Lbs. Evapo-ration	Return Openings In.	Approx. Ship. Wt. Lbs.
*1A	**$165.00**	3	1½	3	200	22	72	3.3	48	1½	440
*1	**160.00**	3	2	3	200	55	72	5.9	85	1½	440
2A	**230.00**	4½	1½	4	200	15	66	4.0	59	2	800
2B	**230.00**	4½	2	4	200	18	66	7.2	104	2	800
2C	**230.00**	4½	2½	4	200	25	66	11.2	163	2	800
*2	**215.00**	4½	3	4	200	60	66	16.1	234	2	800
3A	**320.00**	5¼	2	5	200	15	58	7.9	115	2	1050
3B	**320.00**	5¼	3	5	200	25	58	17.7	258	3	1050
*3	**305.00**	5¼	3½	5	200	60	58	24.2	351	3	1050
4A	**365.00**	6	2½	6	200	15	52	13.3	192	3	1300
4B	**365.00**	6	3	6	200	23	52	19.1	277	3	1300
*4	**345.00**	6	4	6	200	55	52	34.0	492	3	1300

*Pumps have drawn brass tube linings in water cylinders; other sizes have hard cast bronze removable bolted-in liners.

Fittings—all pumps are brass fitted having brass lined water cylinders, brass valves and one piece bronze piston rods. Pumps are furnished with fibrous water piston packing for hot water but no rod packing is supplied.

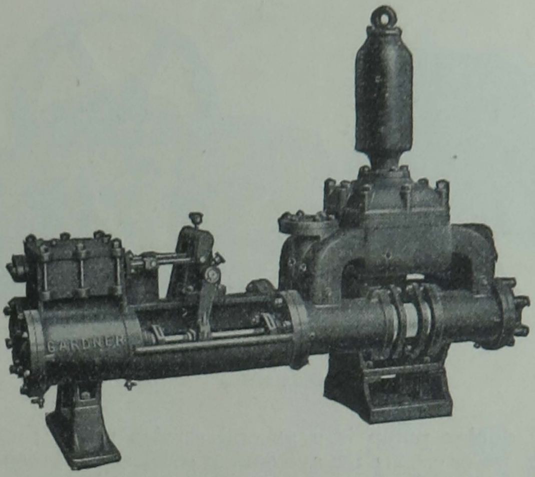
For direct heating radiation .5 pound condensation per square foot per hour.

For indirect radiation 1.5 pounds per square foot per hour.

For green houses, lumber kilns, etc., 2 pounds condensation per square foot per hour.

For laundries, brick-dryers, etc., 5 pounds condensation per square foot per hour.

Gardner-Denver Duplex Outside Center Packed Plunger Pumps



Sizes 8x4x10 to 10x6x10, Inclusive

These pumps are intended for all conditions of service, but are especially recommended for pressures in excess of 150 pounds and for pumping water containing grit, sand or gravel that would quickly cut out and render ineffective the ordinary fibrous-packed piston or plunger and ring patterns.

The plungers being exposed can easily be kept lubricated and all leakage prevented by an adjustment of the stuffing-box glands and proper maintenance of the packing.

The smaller sizes are made with drip pans cast into the water cylinders underneath the plungers to catch the drippings, so they can be piped to a convenient outlet.

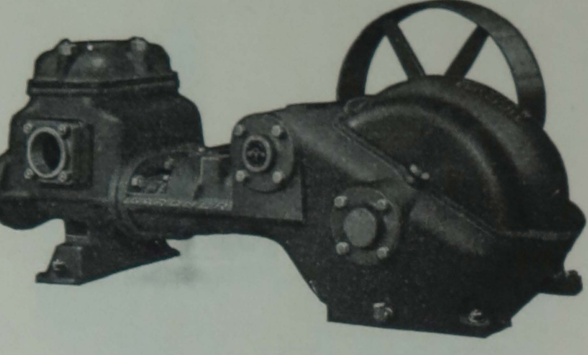
Sizes 10x6x12 and larger have water cylinders cast in sections, securely bolted together. If a rupture should occur in any part of the water cylinders the renewal of that section only is necessary and the repair part can be promptly procured.

Brass fitting consists of brass-covered plungers, brass-lined plunger glands, brass-lined stuffing-box glands and Tobin bronze piston rods on the water ends. Pumps 10x6x10 and smaller do not have brass-lined stuffing-box glands.

Diam. Steam Cvl. In.	Diam. Water Plunger In.	Lgth. Stroke In.	Max. Water Pres-sure	Gal. per Stroke of One Plunger	Dis-place-ment Gal. per Min.	PIPE CONNECTIONS, IN.				Wt. Lbs.
						Steam	Ex-haust	Suc-tion	Dis-charge	
6	**2½**	**6**	300	.13	23 to 46	1	1½	3	2	970
6	**3**	**6**	300	.18	33 " 66	1	1½	3	2	990
6	**4**	**6**	300	.33	59 " 118	1	1½	3	2	1000
7	**3½**	**10**	300	.42	50 " 100	1½	2	4	3	1575
7	**4**	**10**	300	.54	65 " 130	1½	2	4	3	1600
7	**4½**	**10**	300	.69	83 " 166	1½	2	4	3	1630
8	**4**	**10**	300	.54	65 " 130	1½	2	5	4	2700
8	**5**	**10**	300	.83	100 " 200	1½	2	5	4	2760
10	**5**	**10**	300	.83	100 " 200	2	2½	5	4	2860
10	**6**	**10**	300	1.22	147 " 294	2	2½	5	4	3000
10	**6**	**12**	300	1.47	147 " 294	2	2½	6	5	4200
10	**7**	**12**	300	2.00	200 " 400	2	2½	6	5	4275
12	**6**	**12**	300	1.47	147 " 294	2½	3	6	5	4500
12	**7**	**12**	300	2.00	200 " 400	2½	3	6	5	4575
12	**8**	**12**	250	2.61	261 " 522	2½	3	7	6	5600
14	**7**	**12**	250	2.00	200 " 400	2½	3	6	5	4875
14	**8**	**12**	250	2.61	261 " 522	2½	3	7	6	5900
16	**8**	**12**	250	2.61	261 " 522	2½	4	7	6	6350
16	**9**	**12**	250	3.30	330 " 660	2½	4	8	6	8900
16	**10**	**12**	250	4.08	408 " 816	2½	4	8	7	9000
18	**9**	**12**	250	3.30	330 " 660	3	4	8	6	9750
18	**10**	**12**	250	4.08	408 " 816	3	4	8	7	9850
20	**10**	**12**	250	4.08	408 " 816	4	5	8	7	10000

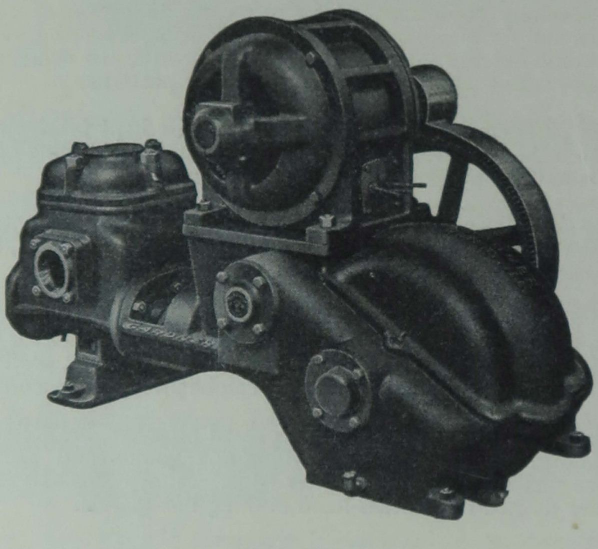
Prices upon application.

Gardner-Denver Duplex Self Lubricating Power Pumps



Belt Drive

This duplex pump is a general service pump for boiler feeding, water circulation and similar services. It is especially popular for installations where only occasional attention can be given.



Motor Drive

The power end is totally enclosed with gears and eccentrics running in oil. Oil is thrown by the gears to channels leading to all bearings so that all moving parts run in a bath of oil.

The eccentrics in place of crank shaft have proven highly successful with this flood lubrication. The advantage of this mechanism is its compactness and simplicity. The eccentrics are cast with the gear, no power being transmitted through the main shaft which takes only the thrust of the water piston.

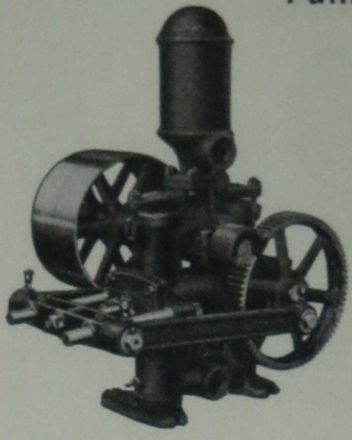
Diam. Cyl. x Stroke In.	Max. Pressure Lbs.	R.P.M.	Gals. per Rev.	Gals. per Min.	H.P.	Ship. Wt. Lbs.
2 x 4	350	50 to 75	.197	10 to 15	3. – 4.5	680
*3 x 4	250	50 to 75	.468	23 to 35	4.7– 7.	700
3¾x 4	150	50 to 75	.744	37 to 56	4.5– 6.7	750
*3½x 5	250	40 to 60	.803	32 to 48	6.4– 9.6	875
4¾x 5	130	40 to 60	1.50	60 to 90	6.1– 9.1	1000
*4 x 6	250	40 to 60	1.26	50 to 76	10. –15.	1400
5¾x 6	120	40 to 60	2.65	106 to 158	9.7–14.5	1575
*4½x10	200	40 to 60	2.64	106 to 158	16.4–24.6	2700
*5 x10	200	40 to 60	3.29	132 to 198	19. –29.	2725
6 x10	110	40 to 60	4.79	189 to 284	16.1–24.2	2875
*6 x10	200	40 to 60	4.74	189 to 284	28. –42.	4875
*7 x10	200	40 to 60	6.51	260 to 390	38. –57.6	5500
*8 x10	150	40 to 60	8.55	342 to 513	37.6–56.4	5550

*Fitted with removable, bolted-in cylinder liners.

Prices upon application.

No. 1531 Goulds Pyramid Double-Acting Pumps

For 75 Pounds Pressure or 175-foot Elevation



Size 2½x4

The cylinder is brass-lined, gears are machine cut, rubber disc valves on bronze grid seats.

The ratings in the table below are based on the assumption that cold water is the liquid used.

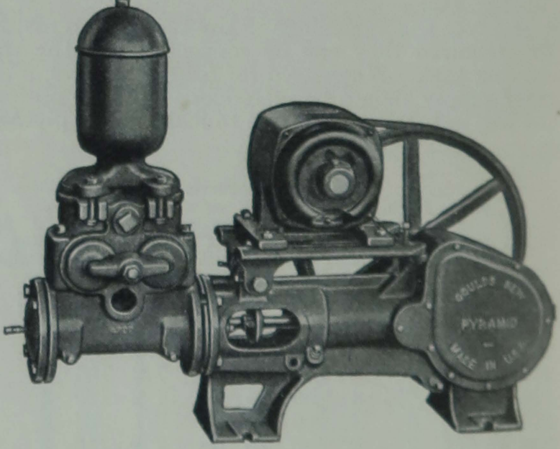
Furnished for belt, direct motor connected and engine drives.

Piston Inches Diam.	Piston Inches Stroke	Each	Disp. One Rev. Shaft Gal.	Max. Speed R.P.M	Disp. per Min. Gal.	H.P. at Cat. Rating
2½	4	$64.00	.162	38	6	½
3	5	85.00	.293	41	12	1
4	5	93.00	.531	40	21	1½
5	5	128.00	.823	40	33	3
6	6	156.00	1.440	40	57	5
6	12	200.00	2.870	40	114	7½

Piston Inches Diam.	Piston Inches Stroke	Size, Pipe, In. Suction	Size, Pipe, In. Discharge	Geared	T. & L. Pulleys In.	Wt. Lbs.
2½	4	1¼	1¼	5 to 1	12x2½	160
3	5	1½	1½	5 to 1	15x2½	280
4	5	2	2	5 to 1	15x3	325
5	5	2½	2½	5 to 1	16x4	500
6	6	3	3	5 to 1	20x4	645
6	12	4	4	6 to 1	26x4	875

Air valve furnished when desired for use with pneumatic tank water supply systems at 75 cents extra.

No. 1813 Goulds Horizontal Double-Acting Piston Pumps



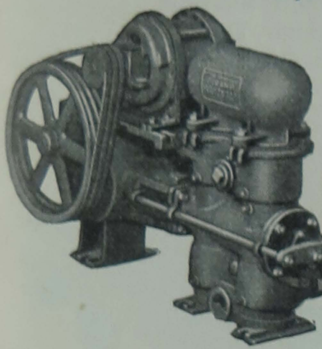
A single cylinder pump made to withstand up to 100 pounds pressure. The power end is a one-piece casting, which forms the base of the pump and the oil reservoir. The piston rod is stainless steel. Suction and discharge on both sides. Gear ratio, 6 to 1.

Diameter Cylinder	in.	2½	3
Stroke	in.	3	4¼
With Single Tight Pulley	each	$49.00	$76.00
With Tight and Loose Pulleys	each	49.00	76.00
With Motor Support and V-Belt Drive Less Motor	each	57.00	90.00
Displacement per Revolution	gals.	.124	.25
Suction Pipe	in.	1¼	1½
Discharge Pipe	in.	1¼	1½
Floor Space		32x13½x25	38x14x31
Weight	lbs.	150	230

Also made in sizes 4x5 and 5x5 inches.

Extra for packed piston special valve and surface packing for hot water, gasoline, etc., all sizes $10.00.

No. 1741 Goulds Improved Pyramid Pumping Units



Complete Unit with V-Belt Drive—Medium Pressure Model

Completely automatic oiling. Complete unit has universal motor overhead mounting. Steel shafts with renewable phosphor bronze bushings. Cylinder is entirely separated from crankcase by wall.

Continuous lubrication. No water can get into oil bath. Connecting rod is phosphor bronze. Piston assembly cannot work loose.

Discharge valves are always under water. Adequate and permanent priming. Packing box readily accessible. Screwed type heavy cylinder liner.

Pumps Without Motors

For Engine or Line Shaft Drive

With Tight and Loose Pulleys

For Medium Pressures

Pump Size....in.	3x2¾	4x2¾	5x4
Each....	$103.00	130.00	215.00
Size Pulleys....in.	15x2½	15x2½	16x4
Weight....lbs.	365	425	800

For High Pressures

Pump Size....in.	1¼x2	2⅛x2¾	2⅜x2¾	*2⅜x4	2⅞x4
Each....	$103.00	130.00	159.00	186.00	205.00
Size Pulleys....in.	12x2½	15x2½	15x4	16x4	16x4
Weight....lbs.	180	380	390	475	595

With Motor Support, V-Belt and Pulley

For Medium Pressures

Pump Size Inches	For Motor Horsepower ⅓ to 1 1 Belt	1½ to 2 2 Belts	3 3 Belts	5 5 Belts	7½ 6 Belts
3x2¾	$114.00	$119.00	......	......	......
4x2¾	141.00	146.00	$151.00	$180.00	......
5x4	......	231.00	236.00	265.00	$285.00
For High Pressures					
1¼x2	$114.00	......	......	......	......
2⅛x2¾	141.00	$146.00	$151.00	......	......
2⅜x2¾	......	175.00	180.00	$209.00	......
*2⅜x4	......	202.00	207.00	236.00	$256.00
2⅞x4	......	221.00	226.00	255.00	275.00

*No air chamber furnished on this size.

Packed piston and surface packing for hot water, gasoline, etc., at extra charge.

Complete Unit with A.C. Motors

For Medium Pressures

Motor H.P.	Pump Size Inches 3x2¾ 1 Ph.	3x2¾ 3 Ph.	4x2¾ 1 Ph.	4x2¾ 3 Ph.	5x4 1 Ph.	5x4 3 Ph.
½	$147.00	$151.00	......	......	......	......
¾	158.00	155.00	......	......	......	......
1	177.00	171.00	$204.00	$198.00	......	......
1½	198.00	188.00	225.00	215.00	$310.00	$300.00
2	223.00	199.00	250.00	226.00	335.00	311.00
3	......	......	283.00	240.00	368.00	325.00
5	......	......	391.00	291.00	476.00	376.00
7½	......	......	......	......	......	420.00

For High Pressures

Motor H.P.	Pump Size Inches 1¼x2 1 Ph.	1¼x2 3 Ph.	2⅛x2¾ 1 Ph.	2⅛x2¾ 3 Ph.	2⅜x2¾ 1 Ph.	2⅜x2¾ 3 Ph.
⅓	$142.00	$144.00	......	......	......	......
½	147.00	151.00	......	......	......	......
¾	158.00	155.00	......	......	......	......
1	177.00	171.00	$204.00	$198.00	......	......
1½	......	......	225.00	215.00	$254.00	$244.00
2	......	......	250.00	226.00	279.00	255.00
3	......	......	283.00	240.00	312.00	269.00
5	......	......	......	......	420.00	320.00

Motor H.P.	Pump Size Inches 2⅜x4 1 Ph.	2⅜x4 3 Ph.	2⅞x4 1 Ph.	2⅞x4 3 Ph.
2	$306.00	$282.00	$325.00	$301.00
3	339.00	296.00	358.00	315.00
5	447.00	347.00	466.00	366.00
7½	......	391.00	......	410.00

Extra for 115 or 230 volt d.c. motors over 1 phase prices, ⅓ h.p. $4.00; ½ h.p. $6.50; ¾ h.p., $7.00; 1 h.p. $57.00; 1½ h.p. $62.00; 2 h.p. $57.00; 3 h.p. $47.00; 5 h.p. $78.00; over 3 phase prices, 7½ h.p. $225.00.

No. 1741 Goulds Improved Pyramid Pumping Units

Pump Data

Complete unit has V-belt drive and universal overhead motor mounting.

All ratings are based on handling clear, cold water.

These pumps should not be operated at speeds less than 65 r.p.m.

For Medium Pressures

For Pressures up to 100 Pounds
Capacities 16 to 82 G.P.M.

Size Pump In.	Displ. Gals. per Rev.	Size Suction and Discharge In.	Gear Ratio	Diam. V-Belt Pulley In.	Diam. Pump Drive Shaft In.	Floor Space In.	Weight Pounds
3x2¾	.163	1½	3:1	17½	1¼	23x43	360
4x2¾	.291	2	3:1	17½	1¼	25x42	440
5x4	.659	2½	3:1	17½	1½	29x55½	895

Size Pump In.	Speed R.P.M. Crank Shaft	Speed R.P.M. Pulley Shaft	Approx. Cap. Gals. Per Min.	Approx. Cap. Gals. Per Hour	Out. Diam. Motor Pulley Inches 1425 R.P.M.	Out. Diam. Motor Pulley Inches 1725 R.P.M.
3x2¾	100	300	16	950	4	3½
	125	375	21	1250	4⅞	4¼
	150	450	24	1450	5½	4⅞
4x2¾	100	300	29.5	1750	4	3½
	125	375	37	2200	4⅞	4¼
	150	450	43.5	2600	6	4⅞
5x4	100	300	66	4000	4	3½
	125	375	82	5000	4⅞	4¼

For High Pressures

Capacities 2½ to 32 G.P.M.

Pump Size In.	Displ. Gals. per Min.	Suction Pipe In.	Discharge Pipe In.	Gear Ratio	Diam. V-Belt Pulley In.	Diam. Pump Drive Shaft In.	Floor Space In.	Weight Pounds
1¼x2	.019	1	¾	3:1	12	¾	18½x34	210
2⅛x2¾	.0773	1¼	1¼	3:1	17½	1¼	23½x43½	410
2⅜x2¾	.0983	1½	1½	4:1	13½	1¼	25 x41	515
2⅜x4	.143	2	2	3:1	17½	1½	27½x52	650
2⅞x4	.2144	2	2	3:1	17½	1½	27½x52	815

Pump Size In.	Speed R.P.M. Crank Shaft	Speed R.P.M. Pulley Shaft	Approx. Cap. Gals. Per Min.	Approx. Cap. Gals. Per Hr.	Out. Diam. Motor Pulley Inches 1425 R.P.M.	Out. Diam. Motor Pulley Inches 1725 R.P.M.
1¼x2	125	375	2.3	138	3½	3
	150	450	2.8	168	4	3½
	175	525	3.3	198	4⅞	4
	200	600	3.8	228	5½	4½
2⅛x2¾	100	300	7.5	450	4	3½
	125	375	9.5	570	4⅞	4¼
	150	450	11.5	700	6	4⅞
2⅜x2¾	100	400	9.5	570	4	3½
	125	500	12	720	4⅞	4¼
	150	600	14.5	870	6	4⅞
2⅜x4	100	300	14	840	4	3½
	125	375	17.5	1050	4⅞	4¼
	150	450	21	1260	*	4⅞
2⅞x4	100	300	21	1260	4	3½
	125	375	26.6	1600	4⅞	4¼
	150	450	32	1900	*	4⅞

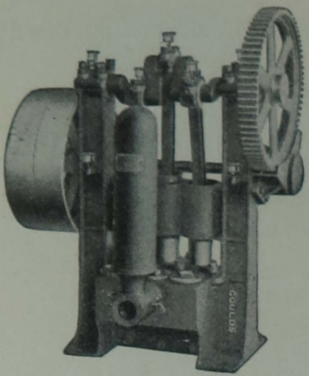
*Cannot furnish.

Motors: Always use double squirrel cage or slip-ring motors for a.c. current and compound wound motors for d.c. current for driving Pyramid pumps.

No. 1696 Goulds Triplex Plunger Pumps

Single Acting

For 150 Pounds Working Pressure or 350 Feet Elevation



No. 1696, Belt-Driven Size 2½x4 Inches

Frame and cylinders of close grained iron, cast in one piece with crosshead guides and cylinders. Crank shaft of high carbon open hearth steel.

Crank shaft and pinion shaft bearings are of babbitt metal.

Gear and pinion are semi-steel, machine cut from the solid. A guard covers the pinion and adjacent teeth of the gear. Gear ratio, 5 to 1.

Crossheads of sizes 4x6 inches and larger are fitted with adjustable shoes which run in bored guides. Sizes 3½x4 inches and smaller, the crossheads are cylindrical in form, and run in bored guides.

Connecting rods of sizes 4x6 inches and larger, strap head and wedge adjustment with bronze boxes at crank end and bronze bushings at crosshead end. Sizes 3½x4 inches and smaller have adjustable boxes babbitted at crank end and bronze bushings at crosshead end.

Hard cast iron plungers accurately machined.

Sizes 2½x4 inches and larger have iron glands. Sizes 2x3 inches and smaller have bronze glands.

Base and valve boxes are of close grained iron, in one casting.

Valves on sizes 3x4 inches and smaller are of bronze. Sizes 3½x4 inches and larger, valves for cold water have rubber discs on bronze grid seats with cylindrically wound springs; for hot water, grid seat valve, with special composition disc is recommended. Sizes 3½x4 inches and larger are furnished with metal valves when ordered, at extra price.

Air chamber supplied with pump. Vacuum chamber to order. Phosphor bronze plungers, bronze lined cylinders and glands, fabric composition pinion, etc., to order.

May be furnished with motor drive.

Ratings are based on pumping clear cold water.

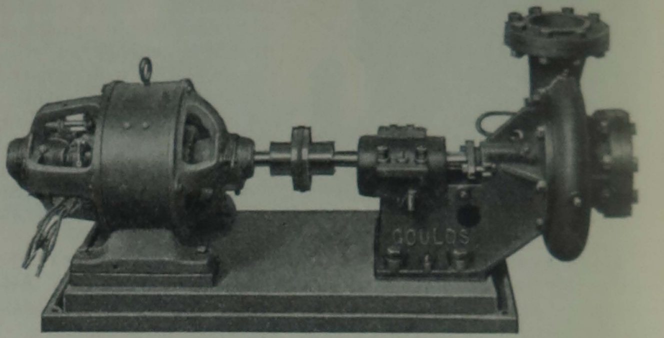
Size Pump Inches Diam.	Size Pump Inches Stroke	Gal. Displacement per Min.	Disp. One Rev. of Crank Shaft Gal.	Revolutions per Minute	Approx. Horse Power at Cat. Rating	Size Pipe Inches Suction	Size Pipe Inches Discharge	Tight and Loose Pulleys Inches	Weight Pounds
1¼	2	2	0.031	67	.35	¾	¾	12x1½	80
1¼	2	3	0.031	97	.53	¾	¾	12x1½	80
1¾	2½	4	0.078	52	.64	1	1	12x2½	200
1¾	2½	6	0.078	77	.89	1	1	12x2½	200
2	3	6	0.122	50	.96	1¼	1¼	12x2½	210
1¾	2½	8	0.078	103	1.17	1	1	12x2½	200
2	3	9	0.122	75	1.33	1¼	1¼	12x2½	210
2	3	12	0.122	99	1.77	1¼	1¼	12x2½	210
2½	4	12	0.255	48	1.71	1½	1½	15x3	260
2½	4	18	0.255	71	2.46	1½	1½	15x3	260
3	4	18	0.367	50	2.29	1½	1½	15x3	400
2½	4	25	0.255	98	3.15	1½	1½	15x3	260
3	4	25	0.367	68	3.07	1½	1½	15x3	400
3½	4	25	0.501	50	3.07	2	2	15x3	425
3	4	35	0.367	96	4.12	1½	1½	15x3	400
3½	4	35	0.501	70	4.00	2	2	15x3	425
3½	4	50	0.501	100	5.65	2	2	15x3	425
4	6	50	0.978	52	5.65	2	2	20x3	825
4	6	60	0.978	62	6.72	2	2	20x3	825
4	6	75	0.978	77	8.26	2	2	20x3	825
5	8	100	2.041	50	10.60	3	3	30x5	1100
5	8	125	2.041	62	13.00	3	3	30x5	1100
6	8	125	2.938	43	13.20	4	4	30x6	1700
5	8	150	2.041	74	15.60	3	3	30x5	1100
6	8	150	2.938	52	15.80	4	4	30x6	1700
6	8	175	2.938	60	18.30	4	4	30x6	1700
7	8	175	4.000	44	19.00	4	4	36x6	1925
7	8	200	4.000	50	21.30	4	4	36x6	1925
7	8	250	4.000	63	26.00	4	4	36x6	1925
7	10	250	5.000	50	26.60	5	5	36x6	2360
7	10	300	5.000	60	31.30	5	5	36x6	2360
8	10	300	6.520	46	32.00	5	5	42x6	4250
8	10	350	6.520	54	36.50	5	5	42x6	4250
8	10	400	6.520	62	41.50	5	5	42x6	4250

Goulds Centrifugal Pumps

Single Stage, Single Suction

Enclosed Impeller Type

No. 3600, Direct Connected



A moderately priced machine designed especially for direct connection to electric motors.

The casing is of the volute type, supported on the bed-plate so that it can be swiveled in any one of eight different positions.

In order to secure high efficiency, the impeller is of the enclosed type. All main bearings are of the ring oiling type.

In addition to cold water this pump may be used for pumping clear liquids such as brine, gasoline, kerosene, light machine oils, etc. For this construction there is no extra charge.

In the rare case of suction lift with liquids other than water, the water seal ring will be left in place, but water must be piped to it from some independent source of fresh, clean supply.

These pumps cannot be used for pumping mash, sewage, paper stock, molasses, paint and other like fluids.

The impeller is regularly made of close grained gray cast iron, and is designed for high efficiency over a wide range of conditions. It is pressed upon the shaft and is held firmly in place by a carefully fitted pin.

Can be furnished standard fitted, brass fitted, or brass.

These brass pumps have all parts which come in contact with the liquid made of brass.

A cast-iron bed-plate of the drip type is provided, upon which the pump and motor are mounted. Pump and motor are connected by means of a flexible coupling.

No.	Pipe Size, Inches Discharge	Pipe Size, Inches Suction	Capacity Gallons per Minute	Floor Space Inches	*Shipping Weight Pounds
1½	1½	1½	40 to 80	23x35	270
2	2	2	80 to 160	23x35	270
3	3	3	150 to 350	28x42	400
4	4	4	250 to 550	33x45	407
5	5	5	400 to 800	35x49	630
6	6	6	500 to 1500	36x57	850
8	8	8	1000 to 3200	42x72	2035
10	10	10	2000 to 5000	38x91	2450

*Includes pump and bedplate, but not motor.

No. 3601, for Belt Drive

No. 3601 is the same pump as described above, but mounted upon short bedplate, and fitted with single tight pulley, for sizes 1½, 2 and 3, and fitted with bedplate, pedestal bearing and single tight pulley for sizes 4, 5, 6, 8 and 10.

Bronze fitted pump should always be used when pump is desired to handle hot water.

No.	Pipe Size, Inches Discharge	Pipe Size, Inches Suction	Capacity Gallons per Minute	Diameter and Face Pulley Inches	Floor Space Inches	Shipping Weight Pounds
1½	1½	1½	40 to 90	5x4	12¼x10½	110
2	2	2	80 to 160	5x4	12¼x10½	110
3	3	3	100 to 300	5x4	14¾x12	220
4	4	4	225 to 500	6x5	14¾x22	310
5	5	5	300 to 700	7x6	17 x25½	425
6	6	6	500 to 1200	9x8	20 x28¾	675
8	8	8	800 to 3200	12x12	29 x41	1440
10	10	10	2000 to 4400	12x12	56 x41	1850

Prices upon application.

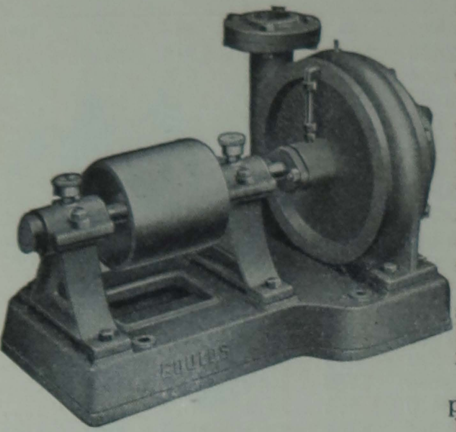
Goulds Nos. 3600, 3601 Centrifugal Pumps

Table of H.P. and R.P.M. for Various Capacities and Heads—Ratings Based on Pumping Clear Cold Water

Pump Size In.	Capacity G.P.M.	R.P.M. and H.P.	Total Head in Feet													
			10	15	20	25	30	35	40	45	50	60	70	80	90	100
1½	40	R.P.M.	740	810	930	1040	1140	1230	1300	1380	1450	1550	1670	1810	1910	....
		H.P.	.4	.5	.6	.8	.9	1.0	1.1	1.3	1.4	1.7	2.0	2.5	2.7	....
	60	R.P.M.	....	925	1050	1090	1180	1260	1340	1400	1480	1570	1700	1820	1920	....
		H.P.	....	.7	.8	.9	1.1	1.2	1.4	1.5	1.7	2.0	2.4	2.8	3.3	....
	80	R.P.M.	....	....	1120	1190	1260	1330	1390	1450	1520	1630	1730	1870	1950	....
		H.P.	....	....	1.0	1.1	1.3	1.5	1.7	1.8	2.0	2.4	2.9	3.3	3.9	....
	90	R.P.M.	....	....	....	....	1310	1380	1460	1500	1570	1670	1760	1910	1980	....
		H.P.	....	....	....	....	1.4	1.6	1.8	2.0	2.3	2.7	3.2	3.6	4.2	....
2	80	R.P.M.	850	930	1000	1090	1180	1250	1330	1390	1460	1620	1690	1800	1900	....
		H.P.	.6	.7	.9	1.0	1.2	1.4	1.5	1.7	1.9	2.3	2.7	3.2	3.6	....
	100	R.P.M.	....	1000	1070	1150	1230	1300	1380	1430	1500	1620	1720	1830	1940	....
		H.P.	....	.8	1.1	1.3	1.5	1.7	1.9	2.1	2.4	2.8	3.2	3.7	4.4	....
	130	R.P.M.	....	....	1200	1270	1340	1400	1470	1530	1570	1690	1800	1900	1990	....
		H.P.	....	....	1.5	1.7	2.0	2.2	2.5	2.7	3.0	3.5	4.0	4.6	5.2	....
	160	R.P.M.	....	....	....	1400	1450	1540	1570	1630	1680	1780	1900	1960	....	....
		H.P.	....	....	....	2.3	2.7	2.9	3.3	3.8	4.0	4.4	5.1	5.7	....	....
3	100	R.P.M.	660	760	860	1000	1060	1080	1140	1210	1260	1400	1510	1620	1710	1800
		H.P.	.7	1.0	1.2	1.4	1.5	1.6	1.8	2.1	2.3	2.9	3.5	4.2	4.7	5.5
	150	R.P.M.	....	830	910	980	1060	1130	1200	1270	1320	1450	1550	1670	1740	1830
		H.P.	....	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	4.0	4.7	5.5	6.1	6.9
	200	R.P.M.	....	910	1000	1060	1120	1190	1260	1350	1380	1490	1590	1690	1770	1860
		H.P.	....	1.4	1.8	2.1	2.4	2.8	3.2	3.7	3.9	4.9	5.7	6.3	7.3	8.2
	300	R.P.M.	....	....	1230	1250	1360	1430	1470	1500	1550	1630	1760	1820	1900	....
		H.P.	....	....	3.5	3.7	4.3	5.1	5.4	5.7	6.3	7.2	8.5	9.6	10.8	....
4	225	R.P.M.	....	....	890	970	1050	1120	1180	1240	1300	1420	1520	1620	1710	1790
		H.P.	....	....	1.7	2.1	2.5	2.9	3.4	3.8	4.2	5.2	6.1	7.2	8.2	9.2
	300	R.P.M.	....	920	1000	1050	1120	1190	1230	1300	1360	1450	1570	1670	1750	1830
		H.P.	....	2.1	2.6	2.9	3.3	3.9	4.2	4.8	5.4	6.3	7.7	8.9	10.0	11.2
	400	R.P.M.	....	1030	1100	1170	1240	1300	1330	1385	1450	1550	1650	1730	1815	1900
		H.P.	....	3.0	3.5	4.1	4.8	5.6	5.6	6.5	7.2	8.6	10.0	11.3	12.7	14.1
	500	R.P.M.	....	....	1280	1320	1370	1420	1480	1520	1580	1650	1750	1830	1920	1990
		H.P.	....	....	5.4	5.9	6.5	7.3	8.2	8.9	9.8	11.0	12.7	14.2	16.0	17.9
5	300	R.P.M.	....	....	840	890	970	1030	1080	1130	1180	1300	1400	1470	1580	1660
		H.P.	....	....	2.3	2.7	3.2	3.7	4.2	4.7	5.2	6.5	7.7	8.9	10.7	12.2
	400	R.P.M.	....	820	890	960	1030	1100	1150	1200	1250	1340	1430	1510	1600	1690
		H.P.	....	2.4	3.0	3.6	4.3	5.0	5.6	6.4	6.7	8.0	9.5	11.0	7.2	14.4
	500	R.P.M.	....	....	990	1050	1110	1180	1220	1260	1300	1390	1480	1560	1650	1720
		H.P.	....	....	4.0	4.8	5.6	6.5	7.2	7.8	8.6	9.9	11.5	13.2	15.1	16.8
	600	R.P.M.	....	....	1080	1150	1200	1260	1280	1330	1380	1470	1550	1630	1710	1790
		H.P.	....	....	5.2	6.3	7.2	8.1	8.7	9.6	10.4	12.3	14.2	16.1	18.2	20.6
	700	R.P.M.	....	....	....	1250	1270	1310	1360	1410	1450	1540	1620	1690	1760	1850
		H.P.	....	....	....	8.0	8.3	9.3	10.3	11.2	12.4	14.5	16.7	19.0	20.9	23.5
6	500	R.P.M.	....	....	....	790	860	920	970	1040	1090	1190	1290	1370	1450	1520
		H.P.	....	....	....	4.0	5.0	5.9	6.8	7.9	9.0	11.1	13.2	16.0	18.3	21.0
	600	R.P.M.	....	....	750	820	890	950	1010	1050	1100	1210	1300	1380	1460	1530
		H.P.	....	....	3.7	4.8	5.9	7.0	8.0	9.0	10.2	12.6	15.2	17.9	20.4	25.6
	700	R.P.M.	....	730	810	880	940	980	1040	1090	1150	1240	1320	1400	1480	1550
		H.P.	....	3.6	4.7	5.8	7.1	7.9	9.3	10.5	11.9	14.5	17.1	19.5	22.4	25.0
	800	R.P.M.	....	790	850	910	970	1030	1070	1130	1170	1270	1350	1420	1500	1580
		H.P.	....	4.4	5.4	6.7	8.0	9.4	10.3	11.8	13.3	16.0	19.2	21.5	24.4	27.8
	1000	R.P.M.	....	....	950	1060	1060	1100	1160	1190	1240	1320	1410	1480	1560	1620
		H.P.	....	....	7.4	8.7	10.3	12.2	13.5	14.6	16.2	19.5	22.9	25.8	29.4	33.0
	1200	R.P.M.	....	....	1090	1110	1150	1190	1250	1290	1320	1410	1480	1550	1620	1680
		H.P.	....	....	10.8	11.8	13.7	14.8	17.0	18.8	20.3	24.0	27.3	30.9	34.8	38.4
8	800	R.P.M.	350	425	460	500	550	620	....	....	....	....	....	....	....	....
		H.P.	3.2	4.7	5.6	7.1	9.0	11.0	....	....	....	....	....	....	....	....
	1200	R.P.M.	400	450	490	540	570	620	650	690	710	780	....	....	....	....
		H.P.	4.7	6.3	7.9	9.8	11.9	13.7	15.6	17.8	19.5	25.0	....	....	....	....
	1600	R.P.M.	470	500	540	580	625	650	685	710	740	810	860	900	960	1030
		H.P.	6.8	8.9	11.6	14.1	16.6	19.0	21.5	23.8	26.2	31.5	36.8	42.0	47.3	55.6
	2000	R.P.M.	....	....	610	650	680	695	720	750	780	840	890	940	990	1050
		H.P.	....	....	4.8	18.5	20.8	23.0	25.8	29.4	32.5	39.0	45.3	52.0	58.0	65.0
	2600	R.P.M.	....	....	720	750	780	810	830	850	870	910	960	1000	1040	1080
		H.P.	....	....	26.0	27.4	32.5	36.5	41.0	42.5	47.0	53.5	60.5	68.0	76.0	85.0
	3200	R.P.M.	....	....	....	....	....	....	....	....	....	....	1050	1080	1110	1150
		H.P.	....	....	....	....	....	....	....	....	....	....	87.0	92.0	98.0	106.0
10	2000	R.P.M.	....	....	480	500	540	575	610	640	680	740	790	840	890	940
		H.P.	....	....	21.0	25.2	26.5	29.4	31.5	33.9	36.1	42.7	49.8	57.8	65.0	74.4
	2600	R.P.M.	....	....	....	540	570	610	640	670	700	760	810	860	900	970
		H.P.	....	....	....	27.3	30.8	34.3	37.5	41.1	43.8	50.3	57.5	65.6	77.8	89.5
	3200	R.P.M.	....	....	....	....	....	650	680	710	740	790	830	880	920	960
		H.P.	....	....	....	....	....	41.3	46.2	47.8	50.5	59.2	68.4	78.3	90.3	103.0
	3800	R.P.M.	....	....	....	....	....	....	725	750	780	820	860	910	950	1000
		H.P.	....	....	....	....	....	....	54.8	56.9	60.0	70.3	81.0	92.6	105.0	119.0
	4400	R.P.M.	....	....	....	....	....	....	....	810	830	870	910	940	1000	1040
		H.P.	....	....	....	....	....	....	....	75.7	81.3	83.5	96.4	111.0	122.0	138.0

No. 3010 Goulds Centrifugal Pumps

Single Stage, Single Suction



These pumps are suitable for moderate heads up to 100 feet. Regularly fitted with tight pulley for belt drive, but can also be equipped with loose pulley as well. The smaller sizes can be arranged for direct connection to electric motor.

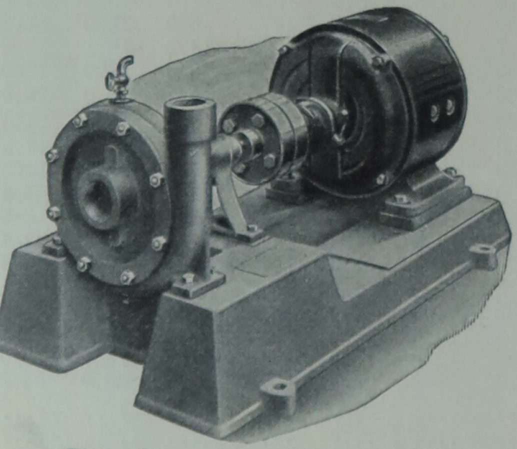
Can be furnished standard fitted, brass fitted, all iron or all brass. Brass fitted pumps have impeller of brass and shaft of non-corrosive metal. Brass pumps have all parts which come in contact with the liquid made of brass excepting the shaft and studs which are monel metal.

Brass fitted construction should always be used where pumps are to be used for handling hot water.

Ratings are based on pumping clear, cold water.

Pipe Connections, Inches Suction	Discharge	Cap. Gallons per Minute	Diam. and Face of Pulley Inches	Floor Space Required Inches	Shipping Weight Pounds
1	1	20	3x 2½	10¾x 7⅜	30
1½	1½	30	4x 3	11¼x 9½	35
2	2	70	5x 5	19¼x12¾	100
3	3	120	6x 6	22¼x16	200
3	3	200	6x 7	24¾x19	265
4	4	270	7x 7	26½x22	375
5	5	470	10x10½	33¼x29¼	650
6	6	750	12x12	37¾x33	850
8	8	1050	14x14	42¾x37¼	1200

No. 3004 Goulds Centrifugal Pumps



Direct Connected to Electric Motor

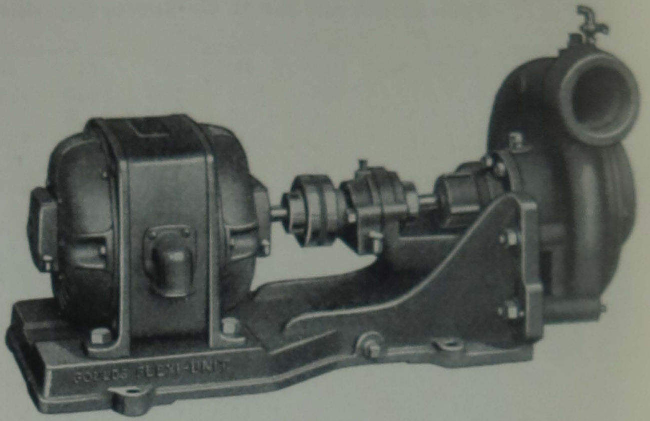
A general service pump built in three sizes with a wide range of ratings. Motors of any standard make and speed can be utilized for drivers.

Available in four constructions: Standard fitted, with iron impeller and casing with steel shaft; bronze fitted, with bronze impeller and shaft of non-corrosive material; all iron, with all parts coming in contact with liquid of iron; all bronze, with all parts coming in contact with liquid of bronze except shaft and studs which are of monel metal.

An assembled-to-order pump. Pump is not assembled until complete information regarding head and capacity, speed and complete motor characteristics are known. This information is essential where pumps are to be shipped complete with motor or shipped less motor.

Pump Size........................inches	1	1½	2
Discharge and Suction................inches	1	1½	2
Ship. Weight, Less Motor and Shims.pounds	45	90	160

Goulds Centrifugal Pumps



Nos. 3057 and 3058

General purpose pumping units. Nos. 3057 and 3058 are single-stage, single bearing centrifugal pumps; Nos. 3157 and 3158 are single-stage, double bearing centrifugal pumps.

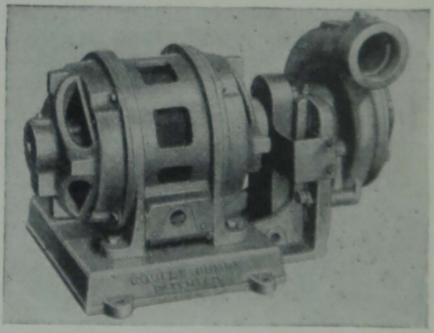
Available in four constructions: Standard fitted, with iron impeller, steel impeller plate where used and steel shaft; bronze fitted, with bronze impeller, stainless steel impeller plate, where used, and stainless steel shaft; all iron, with all parts coming in contact with the liquid of iron; all bronze, with all parts coming in contact with the liquid of bronze except the shaft and impeller plate, where used, which are monel metal.

Pump has top horizontal discharge, spring loaded gland follower and new type of high efficiency open impeller.

Pump is not assembled until complete information regarding head and capacity, speed and complete motor characteristics are known. This information is essential where pumps are to be shipped complete with motor or shipped less motor.

No. 3557 Goulds Centrifugal Pumps

With Direct Connected Motors



For general pumping service for any installation where an inexpensive yet efficient and dependable unit is required.

Open type impeller with hub carried out to form a shaft sleeve over motor shaft. Stuffing box has vertically split bolted gland. Self-venting top horizontal discharge gives quiet running pump with no loss in capacity or head due to air binding. Complete unit can be mounted in any position.

Furnished only as a complete unit with 60-cycle, single-phase, 110–220-volt a.c. motor, and for ratings shown only.

In two constructions: Bronze fitted, and all bronze.

Motor H.P.	Motor R.P.M.	Size Pump Inches	Head In Feet — Gallons per Minute 10	15	20	25	30	35	40	45	50	60
¼	1750	¾	13	10	8	4	..	..	..	..	..	..
¼	1750	1	23	22	21	18	16	13	9	..	..	..
½	1750	1½	..	..	24	23	23	22	21	20	19	15
¾	3550	¾	57	55	52	47	43	38	33	27	20	..

Size Pump Inches	Discharge Inches	Suction Inches	Diameter Impeller Inches	Motor H.P.	Motor R.P.M.	Shipping Weight Pounds
¾	¾	1	4	¼	1750	65
¾	¾	1	4	¾	3550	200
1	1	1½	4¾	¼	1750	120
1½	1½	2	5	½	1750	170

Goulds Motor-Driven Centrifugal Pumps

Ratings

Ratings are for clear cold water. For liquids heavier than water use next larger size motor.

No. 3004

Pump Size In.	Motor		Pipe Size In.		Imp. Diam. In.	Total Head in Feet — Capacity, Gallons per Minute																			
	H.P.	R.P.M.	Suction	Discharge		5	10	15	20	25	30	40	50	60	80	100	140	180	220	260	300	340	380	420	460
1	¼	1450	1	1	5	17	15	12	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	¼	1750	1	1	5	24	23	22	20	15	10	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1½	⅓	1450	1½	1½	5⅜	..	17	16	15	14	13	10	...	...	...	...	...	...	...	...	...	...	...	...	...
1½	½	1450	1½	1½	6	..	21	20	19	18	17	16	...	...	...	...	...	...	...	...	...	...	...	...	...
1½	½	1750	1½	1½	5⅜	..	25	24	23	22	21	19	15	...	...	...	...	...	...	...	...	...	...	...	...
1½	¾	1750	1½	1½	6	..	30	29	29	28	27	25	22	15	...	...	...	...	...	...	...	...	...	...	...
2	1	1450	2	2	6 5/16	..	..	..	26	25	25	24	23	22	19	...	...	...	...	...	...	...	...	...	...
2	1½	1450	2	2	7⅛	..	..	..	32	32	31	31	30	29	25	20	...	...	...	...	...	...	...	...	...
2	2	1450	2	2	8	..	..	..	42	41	41	40	39	38	36	32	...	...	...	...	...	...	...	...	...
2	1	1750	2	2	5⅝	..	..	..	30	30	29	28	27	26	23	15	...	...	...	...	...	...	...	...	...
2	1½	1750	2	2	6 5/16	..	..	..	..	...	...	37	35	34	31	28	...	...	...	...	...	...	...	...	...
2	2	1750	2	2	7⅛	..	..	..	..	...	...	47	45	44	41	37	...	...	...	...	...	...	...	...	...
2	3	1750	2	2	8	..	..	..	..	...	...	60	59	58	56	53	...	...	...	...	...	...	...	...	...

*Nos. 3057, 3157 and 3557

Pump Size In.	Motor		Pipe Size In.		Imp. Diam. In.	Total Head in Feet — Capacity, Gallons per Minute																			
	H.P.	R.P.M.	Suction	Discharge		5	10	15	20	25	30	40	50	60	80	100	140	180	220	260	300	340	380	420	460
† ¾	¼	1750	1	¾	4	..	13	10	8	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
† ¾	¾	3550	1	¾	4	..	57	55	52	47	43	33	20	...	...	...	...	...	...	...	...	...	...	...	...
1	¼	1750	1½	1	4¾	23	23	22	21	18	16	9	...	...	...	...	...	...	...	...	...	...	...	...	...
1	¾	2850	1½	1	4¼	..	47	46	45	42	40	34	26	...	...	...	...	...	...	...	...	...	...	...	...
1	1½	2850	1½	1	4¾	..	64	62	61	59	57	52	45	35	...	...	...	...	...	...	...	...	...	...	...
1	1	3550	1½	1	4	..	..	59	58	56	53	46	38	28	...	...	...	...	...	...	...	...	...	...	...
1	2	3550	1½	1	4¾	..	..	94	92	91	90	84	77	68	59	...	...	...	...	...	...	...	...	...	...
1½	½	1750	2	1½	5	..	..	..	24	23	23	21	19	15	...	...	...	...	...	...	...	...	...	...	...
1½	2	2850	2	1½	5	..	..	..	69	68	67	65	62	59	51	40	...	...	...	...	...	...	...	...	...
1½	3	3550	2	1½	5	..	..	..	..	100	99	97	95	92	85	75	...	...	...	...	...	...	...	...	...
2	1	1750	3	2	5⅞	..	..	..	..	...	31	30	29	28	25	22	13	...	...	...	...	...	...	...	...
2	2	1750	3	2	7	..	..	..	..	...	47	45	44	42	39	36	28	20	...	...	...	...	...	...	...
2	5	2850	3	2	6¼	..	..	..	..	...	...	...	...	97	90	85	76	65	46	...	...	...	...	...	...
2	7½	2850	3	2	6¾	..	..	..	..	...	...	...	...	...	110	107	97	85	71	60	...	...	...	...	...
2	7½	3550	3	2	5⅝	..	..	..	..	...	...	...	114	112	108	102	91	79	64	...	...	...	...	...	...
2	15	3550	3	2	7	..	..	..	..	...	...	...	...	184	180	176	164	150	134	110	...	...	...	...	...
3	3	1750	4	3	7¼	..	..	..	..	...	...	...	...	...	...	55	50	45	40	34	26	15	...	...	...
3	5	1750	4	3	8	..	..	..	..	...	...	...	...	...	...	69	65	61	56	52	45	37	30	20	...
3	10	2850	4	3	6⅝	..	..	..	..	...	...	...	...	...	...	...	112	106	98	92	84	74	62	...	...
3	15	2850	4	3	7¼	..	..	..	..	...	...	...	...	...	...	...	...	138	130	125	116	108	99	88	...
3	20	2850	4	3	8	..	..	..	..	...	...	...	...	...	...	...	...	...	170	163	156	150	140	130	...
3	20	3550	4	3	7	..	..	..	..	...	...	...	...	...	...	...	...	190	184	176	166	154	144	...	...
3	30	3550	4	3	8	..	..	..	..	...	...	...	...	...	...	...	...	266	260	250	240	230	220	180	...

**Nos. 3058, 3158 and 3558

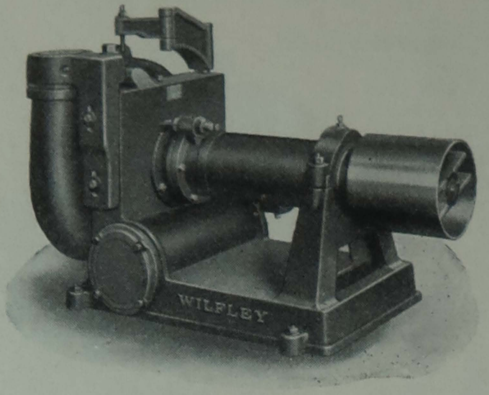
Pump Size In.	Motor		Pipe Size In.		Imp. Diam. In.	Total Head in Feet — Capacity, Gallons per Minute																			
	H.P.	R.P.M.	Suction	Discharge		5	10	15	20	25	30	40	50	60	80	100	140	180	220	260	300	340	380	420	460
1½	1	1750	2	1½	6⅛	..	..	..	38	37	36	34	32	29	24	16	...	...	...	...	...	...	...	...	...
1½	2	1750	2	1½	7	..	..	..	53	52	51	49	47	44	38	32	...	...	...	...	...	...	...	...	...
1½	7½	2850	2	1½	7	..	..	..	..	...	138	136	134	130	122	114	92	68	...	...	...	...	...	...	...
1½	10	3550	2	1½	7	..	..	..	..	...	...	...	198	194	186	176	152	126	...	...	...	...	...	...	...
2	2	1450	3	2	9¼	..	..	..	..	...	...	46	45	43	40	36	25	...	...	...	...	...	...	...	...
2	5	1450	3	2	10	..	..	..	..	...	...	65	64	62	59	55	47	38	...	...	...	...	...	...	...
2	3	1750	3	2	8¾	..	..	..	..	...	...	66	65	63	59	55	44	30	...	...	...	...	...	...	...
2	5	1750	3	2	9½	..	..	..	..	...	...	85	83	81	77	74	64	53	38	...	...	...	...	...	...
2	7½	1750	3	2	10	..	..	..	..	...	...	96	95	93	89	85	77	66	53	...	...	...	...	...	...
2	15	2850	3	2	9⅛	..	..	..	..	...	...	...	...	...	186	180	170	154	136	118	86	...	...	...	...
2	25	2850	3	2	10	..	..	..	..	...	...	...	...	...	246	242	230	215	200	182	162	140	...	...	...
2	25	3550	3	2	9½	..	..	..	..	...	...	...	...	...	...	...	280	264	245	225	190	...	...	...	...
3	5	1450	4	3	9¾	..	..	..	..	...	...	...	...	...	...	63	60	55	50	45	35	25	...	...	...
3	7½	1450	4	3	10 15/16	..	..	..	..	...	...	...	...	...	...	82	78	74	68	62	55	48	38	...	...
3	7½	1750	4	3	9¾	..	..	..	..	...	...	...	...	...	...	...	89	85	78	73	65	56	46	37	...
3	10	1750	4	3	10¼	..	..	..	..	...	...	...	...	...	...	...	100	96	90	84	77	69	60	53	...
3	15	1750	4	3	10 15/16	..	..	..	..	...	...	...	...	...	...	...	120	115	108	102	95	86	78	70	60
3	25	2850	4	3	9⅜	..	..	..	..	...	...	...	...	...	...	...	...	220	216	206	195	180	170	160	...
3	50	2850	4	3	10 15/16	..	..	..	..	...	...	...	...	...	...	...	...	320	316	308	300	290	280	270	...

†Built in No. 3557 type only.

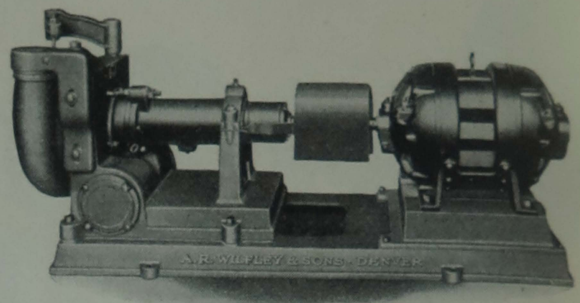
*No. 3057 for 1750 r.p.m. only.

**No. 3058 for 1450 and 1750 r.p.m. only.

Wilfley Centrifugal Sand Pumps



Belt-Driven Pump



Direct-Connected to Motor

Used in mining, smelting, cement, sand and gravel and general industrial fields for the economical and reliable handling of various kinds of gritty and abrasive materials and also hot and muddy solutions. It has been successfully applied to pumping distances greater than a mile, densities up to 75 per cent solids, and for pressures up to 90 pounds per square inch.

In the mining industry almost every conceivable kind of mill pulp is being pumped in connection with table concentration, flotation, cyanidation, amalgamation, ochre and barytes washing, thickening, filtering, classification, ball, rod and tube mills, jigs, and disposal of general mill tailing. Applications in the Smelting Industry are the pumping of granulated slag and flue dust. Also for brass reclamation.

It has a centrifugal seal consisting of a revolving member called expeller, having wings or paddles radiating from a recess in its center to its periphery and a stationary member which has a projecting groove. The revolving member is cast integral with the runner and is set close to the stationary member, which acts as a side-wearing plate.

The material pumped is prevented from leaking out by the centrifugal action of the wings of the expeller, similar to that of an open runner, and any slippage by the side is caught by the projecting groove and delivered to the wings.

A patented automatic check-valve seals around the shaft while the pump is not in operation.

Since this seal opens the intake chamber to the atmosphere, the pump has no suction so must be set below the supply, so that the material to be pumped will flow into the pump by gravity.

The pump is provided with a take-up adjustment which may be made in a few moments while the pump is in operation by simply tightening the threaded draw bolt, provided on the frame, until the runner is heard or felt to rub the follower plate, and then slightly relieved.

This adjustable feature enables pump to deliver a maximum efficiency up to the time the wearing parts are completely worn out and have to be renewed.

Wearing parts are easily changed in a few minutes.

The bearing unit may be installed or removed from the pump in a few minutes. It has 2 sets of non-adjustable ball bearings mounted on a heavy shaft and enclosed in a cylindrical housing, which serves as an oil reservoir for the bearings, assuring perfect bearing alignment at all times, and is remarkably water and grit proof.

All sizes, except the 1-inch and 2-inch, are provided with a hinge crane to facilitate handling the heavy case.

Specifications

Maximum Capacities

Size Pump In.	Pipe Conn. In. Disch.	Pipe Conn. In. Intake	Percentage of Solids by Wt. 5% G.P.M.	5% Min. Intake Head Ft.	25% G.P.M.	25% Min. Intake Head Ft.	50% G.P.M.	50% Min. Intake Head Ft.	65% G.P.M.	65% Min. Intake Head Ft.	Max. Size Part. Recom.	*Approx. Ship. Wt. Lbs.	**Approx. Ship. Wt. Lbs.
1	1	2	35	3	30	3	25	3½	20	3½	¼	475	690
2	2	4	175	3	140	3	110	3½	100	4	½	715	1090
3	3	5	250	3	225	3	190	3½	160	4	½	950	1350
4	4	6	500	3½	450	3½	350	3½	300	4	¾	1730	2275
6	6	8	1000	5	850	5	700	5	600	5	1	2650	3450
8	8	10	2200	3	1800	3	1650	3	1500	3½	1	3950	5650
3CA	3	5	250	3½	225	3½	190	3½	160	4	½	1050	1530

*Pump complete with standard pulley for belt drive.

**Pump complete mounted on sub-base with coupling for direct connecting to electric motor.

Intake heads measured from pump shaft.

Speed Table

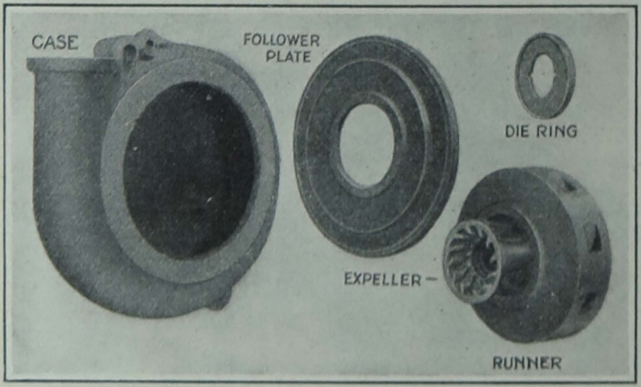
Based on 60 Mesh Solids and 25 Per Cent Solids by Weight

Size Pump In.	Std. Pulley Diam. In.	Std. Pulley Face In.	Std. Runner Diam. In.	*Total Discharge Head in Feet 20	30	40	50	60	70	80	90	100	110	130	140
1	6	4	9	1200	1380	1610	1760	....	....	....	....	....	....	....	....
2	6	6	10½	1035	1180	1350	1480	1620	1740	1850	....	....	....	....	....
3	8	6	13	....	925	1035	1150	1250	1345	1435	1525	1600	1700	....	....
3CA	8	8	14	....	....	....	....	1160	1245	1330	1415	1495	1585	1760	1870
4	10	10	16	....	775	855	930	1015	1095	1175	1245	1315	1390	....	....
6	12	12	18	....	....	715	785	850	915	980	1035	1085	1140	....	....
8	14	14	20	....	....	660	720	790	850	910	970	1020	1075	1170	....

*Vertical lift plus friction head.

Refer to Engineering Department for recommendations.

Wearing Parts



Prices upon Application

Wearing parts are designed for high efficiency and at the same time are made unusually heavy in order to increase the time between changes.

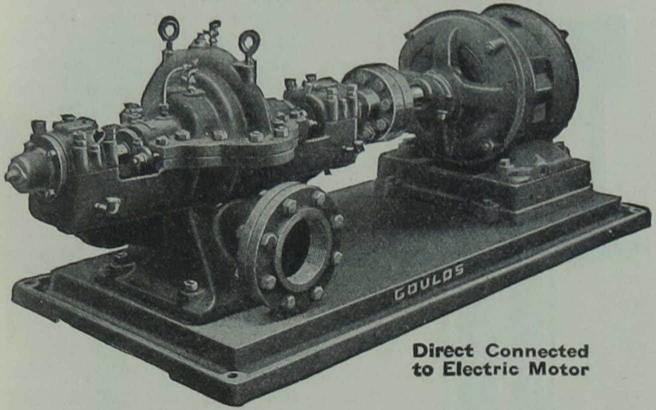
Parts are made of special hard iron which is extremely hard and uniform; clean throughout; is the result of many years of investigation of materials to withstand the wear. The runner, die ring, and follower plate usually go out together, and the case usually outlasts from 2 to 3 runners.

Parts	Pump Weight, Lbs. 1-In.	2-In.	3-In.	4-In.	6-In.	8-In.	3-In. CA Pump
Case	75	160	210	360	775	1080	236
Follower Plate	25	40	58	90	150	190	67
Runner and Die Ring	..	55	84	155	240	325	..
Two-Piece Runner and Die Ring	41	54	84	...	...	...	93

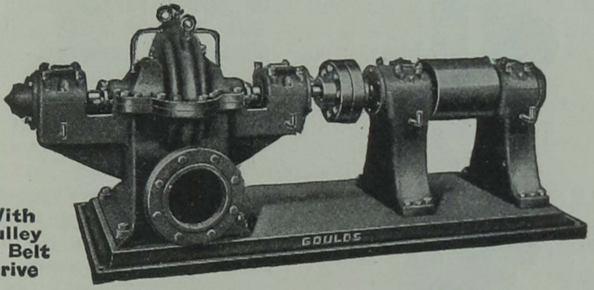
Goulds Centrifugal Pumps

Single Stage, Double Suction

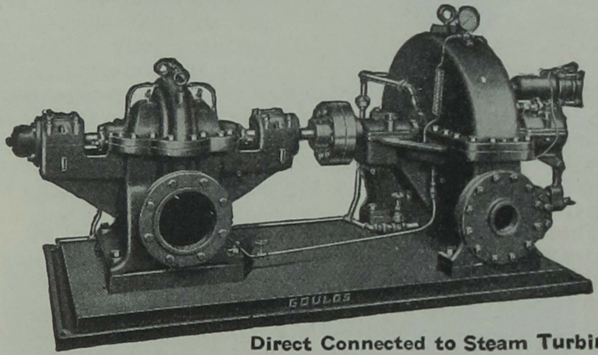
Average Maximum Working Pressure, 130 Pounds, or 300 Feet Total Head



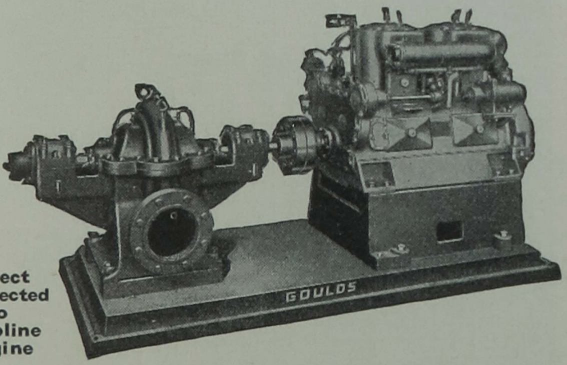
Direct Connected to Electric Motor



With Pulley for Belt Drive



Direct Connected to Steam Turbine



Direct Connected to Gasoline Engine

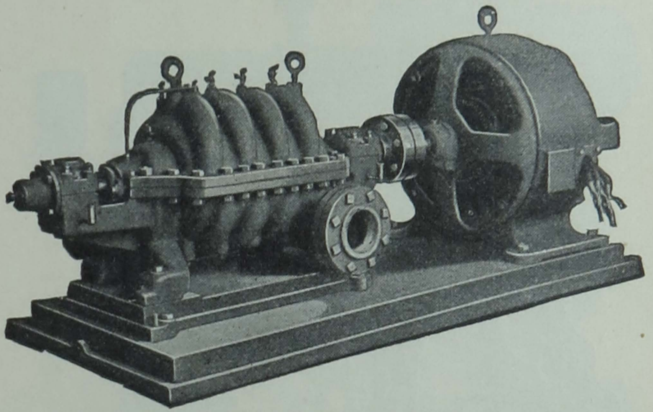
Ratings are based on pumping cold water.

No.	No. Pump	Size Pipe, In. Discharge	Size Pipe, In. Suction	Approx. Cap. Gal., per Min. Min.	Approx. Cap. Gal., per Min. Max.	Std. Pulleys Inches Diam.	Std. Pulleys Inches Face	Ship. Wt. Lbs.
3065	5	5	6	400	800	8	8	1020
3065	6	6	8	600	1700	10	10	1325
3065	8	8	10	1000	3200	12	12	2100
3065	10	10	12	2000	4400	12	12	3300
3075	5	5	6	400	800	8	8	1275
3075	6	6	8	700	1600	10	10	1605
3075	8	8	10	1100	3000	12	12	2525
3085	2	2	3	40	325	5	5	600
3085	3	3	4	150	500	6	6	950
3085	4	4	5	250	750	10	10	1270
3085	5	5	6	400	1000	10	10	1520
3085	6	6	8	800	1700	12	12	2400
3085	8	8	10	1300	3000	12	15	3425
3095	2	2	3	50	250	6	6	1020
3095	3	3	4	200	550	8	8	1120
3095	4	4	5	300	1000	10	10	1585
3095	6	6	8	500	2000	12	12	2900

Prices and special bulletin upon application.

No. 3330 Goulds Horizontal Multi-Stage Centrifugal Pumps

For 370 Pounds Working Pressure or 800 Feet Elevation



5-inch, 4-stage Direct Connected to Electric Motor

Casing

Close grained grey cast iron of the volute type, horizontally split, with the suction and discharge nozzles in the lower half.

Impellers

Single suction, enclosed type bronze impellers, hydraulically balanced.

Wearing Rings

Plain bronze removable casing wearing rings.

Shaft

Alloy steel, heat treated, threaded for shaft sleeves.

Shaft Sleeves

Cast bronze sleeves, ground finish.

Bearing Housings and Bearings

Lower halves cast integral with lower half pump casing. Upper halves doweled and bolted in place. Main bearings, horizontally split, cast iron shells, babbitted, bored, reamed and scraped to a running fit. Ring oiled.

Thrust Bearing

Self Aligning, double acting ball thrust bearing of standard make, running in an oil bath.

Stuffing Boxes

Extra deep. Water seal rings of bronze, piping of copper tubing and fittings of brass, all for suction stuffing box only. No water seal fittings regularly required for discharge stuffing box.

Stuffing Box Bushings

Heavy bronze bushings securely locked in place by means of lugs.

Glands

Cast iron, horizontally split and secured by swing bolts.

There are three constructions: bronze fitted, as described above; all iron, all parts coming in contact with the liquid made of iron; all bronze, all parts coming in contact with the liquid made of bronze.

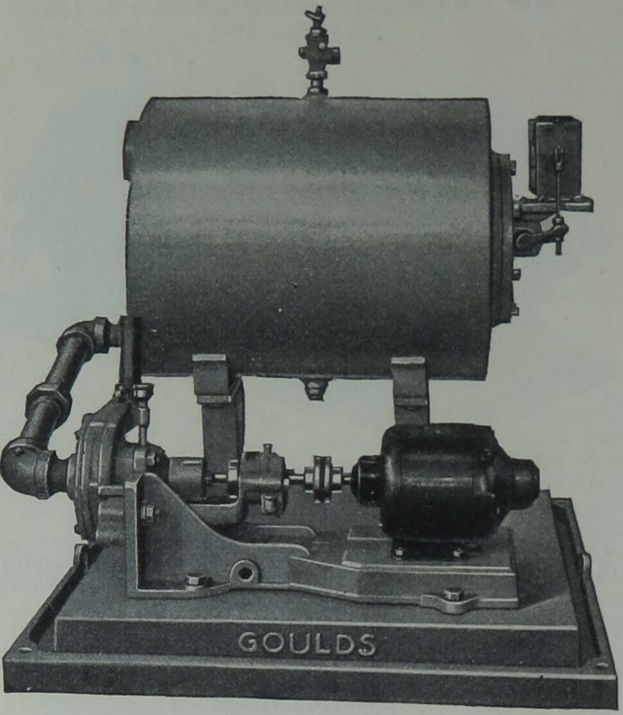
Extras are the bronze impeller wearing rings, case hardened steel shaft sleeves. Special metallic stuffing box packing for hot and cold petroleum products.

Sizes and Capacities

Size Pump In.	Pipe Sizes, In. Suction	Pipe Sizes, In. Discharge	Approx. Range of Cap. Gal. per Min.	Max. No. of Stages	†Wt., Lbs. Comp.
3	3	3	40– 280	6	1400
4	4	4	120– 500	6	2350
5	5	5	200– 900	5	3475
6	6	6	300–1700	5	4800
8	8	8	350–2000	4	5550

†With maximum number of stages.

Goulds Horizontal Condensate Return Units



Unit No. 15-25-10

Where the return lines from steam radiators, steam jacketed kettles, pipe coils, or other steam heated apparatus are located below the water level in the boiler, it is necessary to collect the condensate from them in a receiver and pump the hot water back into the boiler.

The condensate return unit consists of the tank, vented to the atmosphere; a float switch which automatically starts the pump when sufficient condensate has collected, and stops it when pump has delivered the charge to the boiler; and the pump unit consisting of pump and motor. The top horizontal discharge of centrifugals makes this type of pump particularly adapted to hot water as vapor binding cannot occur.

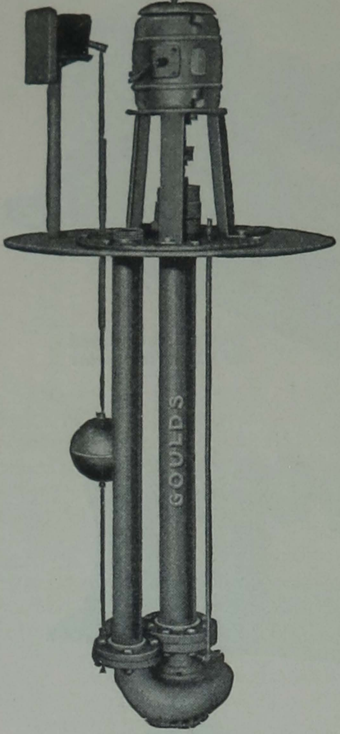
Bearings and stuffing box assembly and bedplate are all separate units, interchangeable and easily renewed. Tanks are of rust resisting copper bearing steel. The unit is furnished complete as shown, ready for piping and wiring.

Ratings Based on ¼ Lb. Condensate per 100 Sq. Ft. Radiation

Max. Sq. Ft. Direct Rad.	G.P.M. Rad. Will Condense	Pump G.P.M.	Pump Press. Lbs.	1750 R.P.M. Motor	Pump No. and Size	Receiver Capacity Gals.	Unit No.
2000	1	5	10	¼	3004–1″	20	2– 5–10
			15	¼	3307–1″	20	2– 5–15
			20	⅓	3307–1″	20	2– 5–20
3000	1½	5	10	¼	3004–1″	20	3– 5–10
			15	¼	3307–1″	20	3– 5–15
			20	⅓	3307–1″	20	3– 5–20
6000	3	10	10	¼	3004–1″	20	6–10–10
			15	¼	3307–1″	20	6–10–15
			20	½	3307–1″	20	6–10–20
10000	5	15	10	¼	3004–1″	20	10–15–10
			15	⅓	3307–1″	20	10–15–15
			20	½	3307–1″	20	10–15–20
15000	7½	25	10	½	3558–1½″	40	15–25–10
			15	¾	3558–1½″	40	15–25–15
			20	1	3558–1½″	40	15–25–20
20000	10	30	10	½	3558–1½″	40	20–30–10
			15	¾	3558–1½″	40	20–30–15
			20	1	3558–1½″	40	20–30–20
25000	12½	35	10	½	3558–1½″	40	25–35–10
			15	¾	3558–1½″	40	25–35–15
			20	1	3558–1½″	40	25–35–20
40000	20	60	10	¾	3558–1½″	60	40–60–10
			15	1	3558–1½″	60	40–60–15
			20	1½	3558–1½″	60	40–60–20

No. 3047 Goulds Drainage Pumps

Submerged Type



A large size, submerged type sump pump, built in single and duplex units for pit depths from 3 to 20 feet. The new, high efficiency impeller will pass water containing coarse, stringy or fibrous materials, and will permit the use of motors one or two sizes smaller than are generally used on a pump of this type.

Made in 4 sizes to handle from 20 to 650 g.p.m., for heads up to 70 feet.

Motor and float switch are mounted on steel pit cover. Covers of 40-inch diameter, 36 inches square, or larger rectangular type will include an 11x15-inch manhole with cover. All pit covers have circular openings to permit removal of pump and motor unit without disturbing the pit cover.

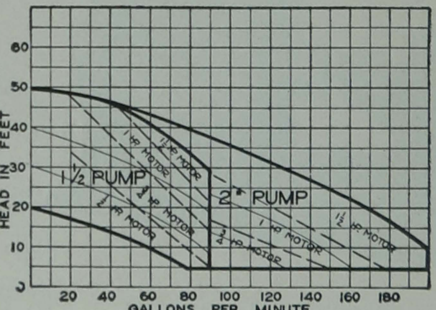
Duplex outfits, No. 3048, are made up of two single pump and motor units mounted on a large main pit cover. Either unit is removable and floats can be set so that second pump operates only when conditions are abnormal.

Due to the standardized design of these pumps, exceptionally quick deliveries can be made on pumps for all listed ratings. Many sump installations can be arranged for a 5-foot pit depth and by doing this, advantage of immediate shipment may be had by the purchase of a Goulds Stock Unit.

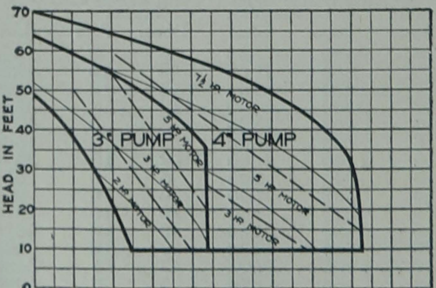
These stock units consist of pump, small steel pit cover plate 22-inch diameter, stock motor and control, for any ratings shown below, all arranged for a pit depth of 5 feet. For greater depths, standard parts are available to make up units suitable for pit depths of 8, 11, 14, 17 and 20 feet. Pumps can also be furnished for pit depths of less than 5 feet and for intermediate depths up to 20 feet in accordance with specifications.

Selection Charts

These charts show the performance of drainage pumps at 1750 r.p.m. The sections blocked out by the heavy lines indicate the size pumps to select and the dash lines indicate the division points between standard sizes of motors. The light full lines indicate the capacity-head characteristic of certain impeller diameters. They serve as a guide in estimating the performance of the pump in cases where the head is not constant.



1½ and 2-Inch Pumps, 1750 R.P.M.

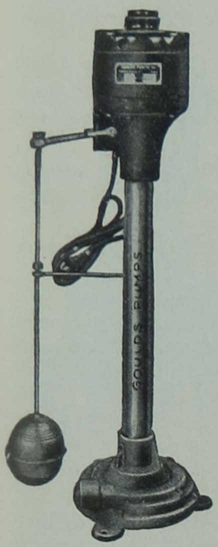


3 and 4-Inch Pumps, 1750 R.P.M.

Ask for Bulletin Giving Complete Information

No. 3128 Goulds CID Cellar Drainers or Sump Pumps

All Bronze Construction



A low priced pumping outfit for draining cellars or sump pits in residences, stores, schools, etc. It is a self-contained vertical type centrifugal pump of all bronze construction, compact and easily installed. All the user has to do is to connect the discharge to sewer or other waste point. Plug in the electric cord and the unit will operate automatically.

The casing, impeller, lower bearing support, float, float rod and float rod lever and guides are of bronze. Pipe column is heavy bronze tubing. Pump shaft is stainless steel. No possibility of rust or corrosion during idle periods.

Pump is all bronze with 3 supporting feet cast integral with pump casing. Pump may be set on bottom of sump with no other support. Pump casing is made in 2 parts.

Motor support integral part of motor. Furnished only with ¼ h.p., 1750 r.p.m., 60-cycle, 110-volt a.c. single phase motor.

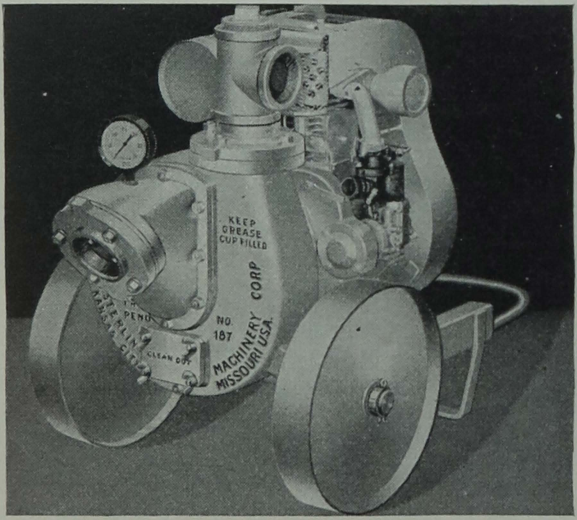
Regularly furnished with 8-ft. rubber covered cord with plug for connecting to any plug-in outlet or lamp socket.

Ratings.—1900 g.p.h. 5 ft., 1500 g.p.h. 10 ft., 900 g.p.h. 15 ft., 400 g.p.h. 20 ft.

Number	**3128**
Each	**$35.00**
Discharge........inches	1
Pit Depth........feet	2
Minimum Pit Diameter........inches	18
Motor H.P	¼
Weight........pounds	55

Model MF Sterling 3-Inch Pumps

Automatic Priming—Adjustable Impeller



Has lifting bails, adjustable wide blade trash type impellers, automatic priming action, etc. Designed throughout to pump water containing large percentages of material.

Trucks are constructed of steel channels.

Equipped with Wisconsin air cooled engine which develops 5 h.p. at 1600 r.p.m. and 5.4 h.p. at 2000 r.p.m.

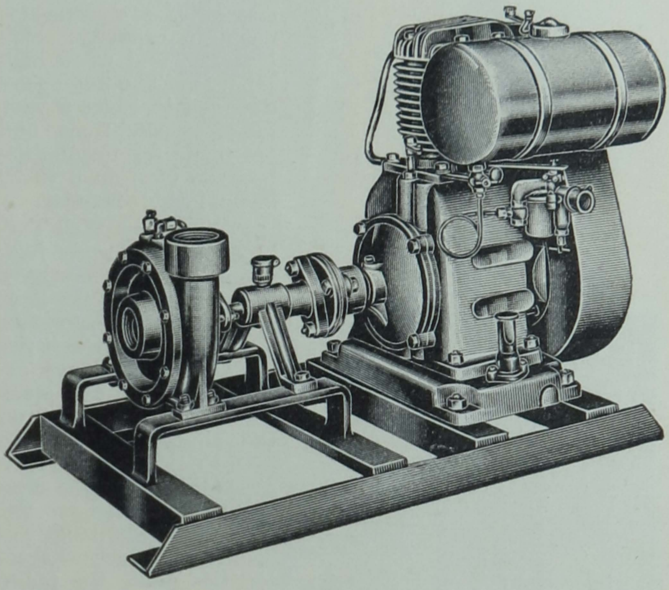
Lifting bail, suction strainer and vacuum gage included.

On 2-Wheel Truck, 16x3-Inch Steel Disc Wheels. Shipping Weight, 535 Pounds........each	**$245.00**
On 2-Wheel Truck, 2 Roller Bearing Wheels with Pneumatic Rubber Tires 16x4 Inches, Shipping Weight, 510 Pounds........each	**255.00**
On Steel Skids, Shipping Weight, 475 Pounds..each	**235.00**

Capacities

Total Head....ft.	**10**	**20**	**30**	**40**	**50**	**60**	**70**
G.P.H..........	19380	18420	16920	14850	12210	8760	4500

Nelson Jumbo Engine-Driven Centrifugal Pump Units



Adapted for irrigating, for pumping either clear or dirty water from sewers, trenches and cellars, or on scows and barges, also for road building and general construction service.

Unit is mounted on welded steel base and is easily portable.

The engines used in these units are 4 cycle, with high tension flywheel magneto, self lubricating and with bronze bearings babbitt lined.

The speed can be varied between 1500 and 2400 r.p.m. by means of a convenient governor control.

The gasoline consumption averages .14 gallons per h.p. hour.

The pump is side suction. Has open type impeller. End thrust is taken care of by an end thrust bearing.

The stuffing box is provided with a brass water sealing ring. Water at working pressure is supplied to this ring which prevents any air being drawn into the pump through the stuffing box to destroy the vacuum.

All parts are interchangeable.

Unit No........	**1**	**2**	**3**
Each........	**$60.00**	**75.00**	**85.00**
Engine........h. p.	1	2	3
Overall Width........in.	14½	17½	17½
Overall Length........in.	30	31	34
Overall Height........in.	18½	20¾	22
Intake........in.	1	1½	2
Discharge........in.	1	1½	2
Ship. Weight........lbs.	145	210	245

Performance Table

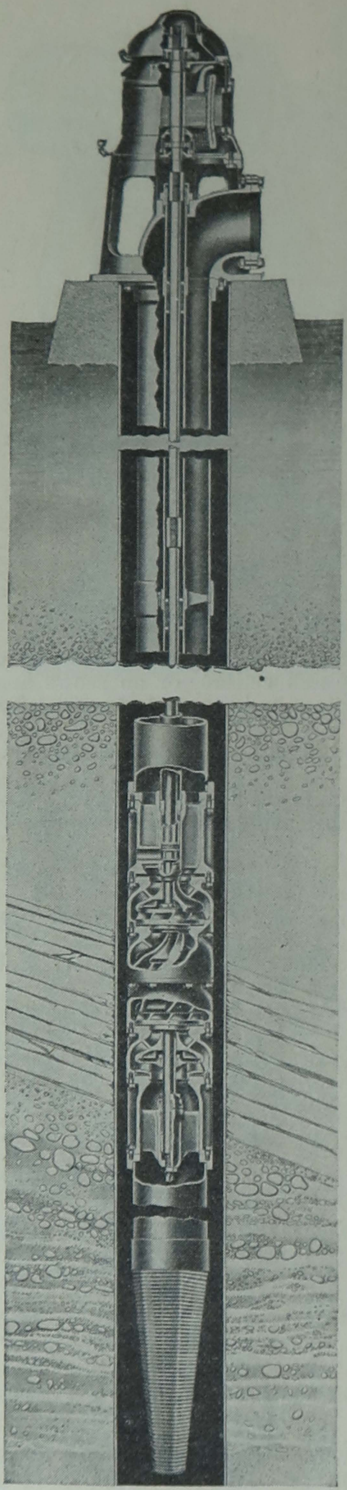
Total Head in Feet	Unit No. 1		Unit No. 2		Unit No. 3	
	G.P.M.	R.P.M.	G.P.M.	R.P.M.	G.P.M.	R.P.M.
5	40	2000	75	1700	120	1800
10	38	2000	70	1750	110	1850
15	35	2000	65	1800	105	1875
20	28	2005	60	1825	100	1900
25	20	2010	40	1850	95	1925
30	10	2016	20	1875	90	1950
35	..	....	5	1900	80	1975
40	..	....	..	....	60	2000
45	..	....	..	....	35	2000
50	..	....	..	....	20	2000

Always use a foot valve unless water flows to pump.

For best results, the suction lift should not exceed 10 to 15 feet.

A pitcher spout pump with special base connected in discharge line for priming is recommended.

Pacific Deep Well Turbine Pumps



Pacific Deep Well Turbines are divided into the classes of low capacity, medium capacity, high capacity, and extra high capacity. The pumps are designed to cover a wide range of conditions, and are made for installation in wells of from 6 to 26 inches inside diameter.

Pacific Deep Well Turbines are uniformly high in efficiency. They have been designed in the light of considerable experience as to the characteristics most desired. Head capacity curves are steep and do not flop over on the shut-off side. The brake h. p. curves are non-overloading. In most cases the h. p. curves are flat throughout the length of operation. Such characteristics make the pump almost ideal, inasmuch as there is no chance of the motor being overloaded due to the rise of the water level in the well. The steep head capacity curve means that the pump will deliver nearly a constant capacity over a wide fluctuation of the water level in the well.

Pacific Turbines are suitable for working against high-pressure heads above the surface. There are many Pacific installations of this kind—some of them working against heads of 400 feet above surface.

Unit Drive Discharge Heads.—In this head the flexible coupling is eliminated. It is simple, low in design, and foolproof. Unit drive heads are known as Type UD. They are arranged with surface discharge and are interchangeable for both belt drive and motor drive without removing the discharge head from the column. The motor furnished is a standard, complete auto start motor.

H. U. Heads.—This style of head is furnished for any make of motor where a flexible coupling drive is necessary. It is fitted with underground discharge and is furnished with Hess-Bright ball radial thrust bearings.

Gravity Feed Lubrication System.—Clean light oil is fed to the line shaft housing—drop by drop from a 1-gallon oil reservoir. The reservoir is fitted with sight feed glass and regulator. The regulator is opened and set for the proper amount of oil feed when the pump is started, and closed off when pump is shut down.

Pacific Discharge Column Construction.—A special feature of this construction is the bronze locked spider guide. Being threaded and locked to the shaft housing, there is no chance of movement. The outer ring of the spider guide is also locked between the faced ends of the heavy column pipe.

The column pipe is heavy oil well casing. Standard 20-foot sections are regularly furnished.

The shaft housing, furnished in standard lengths of 6 feet 8 inches, or 5 feet, forms a protective casing around the shaft. A bunting bronze line shaft bearing is pressed into one end of each section of shaft housing.

The Cumberland turned and ground line shafting used is well known for its straightness and high polish. It is a high-carbon steel ground to a close tolerance.

A Pacific bronze locked spider guide is furnished with every section of pump column.

Turbine Pump Bowls.—The turbine pump proper is a special design of the turbine type of centrifugal, and consists of any suitable number of stages. Each stage is a complete pump in itself; thus two stages of a turbine pump will lift the rated capacity of water just double the height of a single-stage pump, and so on.

Unless otherwise specified, Pacific Pumps are always furnished with government bronze impellers. They will not rust and the impeller blades are not subject to breakage.

Deep Well Turbine Development.—Wells are drilled, penetrating the soil to the underlying gravel strata, or water bearing sand. The wells are cased with a riveted steel, 10 or 12-gage casings, used in double thickness. The casing is perforated at the gravel strata, and the water in the average case, rises to a standing water level of 50 or 75 feet below the surface. When a pump is installed and operated, the water level lowers to various depths. The lowering of the water under pumping or "drawdown," is usually 20 to 30 feet.

Well diameters used are as follows: 6, 8, 10, 12, 14, 16, 18, 20, and 26 inches. Capacities of these wells run from 200 to 4000 g.p.m. In general, the most popular size well is 10, 12 or 16 inches i.d., and the average capacity is from 600 to 1000 g.p.m.

The deep well turbine is primarily a Multi-Stage, Centrifugal Pump which is installed in the well with the bowls located at the lower end of the supporting column pipe, beneath the pumping water level. The supporting column pipe acts as the discharge.

In the center of this column pipe, there is a stationary shaft housing made up in sections of 5 or 6⅔ feet in length, with a line shaft bearing at each joint. Inside of this tube, there is located a transmission shaft which drives the impellers of the centrifugal pump.

At the top of the column, and located at the surface of the ground on a concrete foundation, is the discharge head. A vertical driving motor is located on top of the discharge head.

In Pacific Pumps, the motor furnished is a complete hollow shaft, turbine type, weatherproof motor. The motor shaft is coupled to the transmission shaft of the pump, and the thrust load of the shaft and impellers is carried on a thrust bearing which is located in the top of the motor.

The thrust bearing is easily accessible for inspection. The vertical shaft adjustment of shaft and impellers may be easily checked by simply removing the top cap of the motor.

If required, a belted attachment with vertical pulley may be furnished in place of the motor. In this case, the pump is usually driven by an engine with a quarter turned belt.

Pacific Motor Driven Pumps are usually shipped with complete starting panel and wiring in conduit, with push button operated switch. The properly wired, fully enclosed, steel panel is the safest protection both for the equipment and for the operator.

Information Required for Quoting Prices.—Inside diameter and depth of well.

Capacity required in gallons per minute.

Standing level of water.

Estimated level when pumping above capacities.

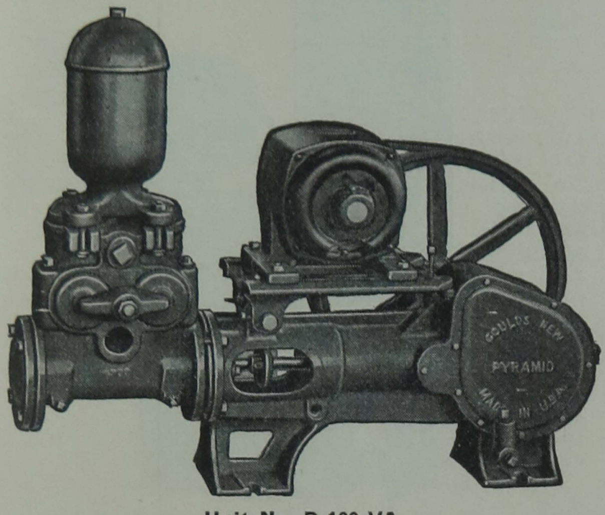
Pumping head above surface in feet or pounds pressure.

Type of drive desired; vertical motor drive, belt drive, motor drive with engine, etc. If motor drive, give phase, cycle and voltage.

Prices and Further Information upon Application

No. 1813 Goulds New Pyramid Shallow Well Units

Capacity, 1000 Gallons per Hour



Unit No. P-100-VA

Open Tank Service

The Type V pumping unit consists of automatic-oiling, horizontal, double-acting piston type pump, size 3x4¼ inches, with large air chamber, ¾ or 1 h.p., 60 cycle, 110–220 volts, single phase, repulsion-induction motor mounted on adjustable base; V-belt drive, air valve and relief valve. Pulley shaft diameter, ⅞ inch.

Pressure Tank Service

The Type VA pumping unit is the same as the Type V and with addition of pressure switch with overload and low voltage protection incorporated.

Complete Pressure Tank Systems

The Type VAT pumping unit is a complete storage system with automatic-oiling, horizontal, double-acting, piston type pump, size 3x4¼ inches, with large air chamber, ¾ or 1 h.p., 60 cycle, 110–220 volts, single phase, repulsion-induction motor mounted on adjustable base; V-belt drive; Goulds improved air valve; 42-gallon galvanized, vertical storage tank with pipe and fittings for connecting to pump discharge when set together; automatic air volume control, pressure gauge, pressure switch with overload and low voltage protection incorporated, and relief valve.

Floor space, 34x33x50 inches.

Pumping Units—V-Belt Drive

With 17½-Inch Pulley

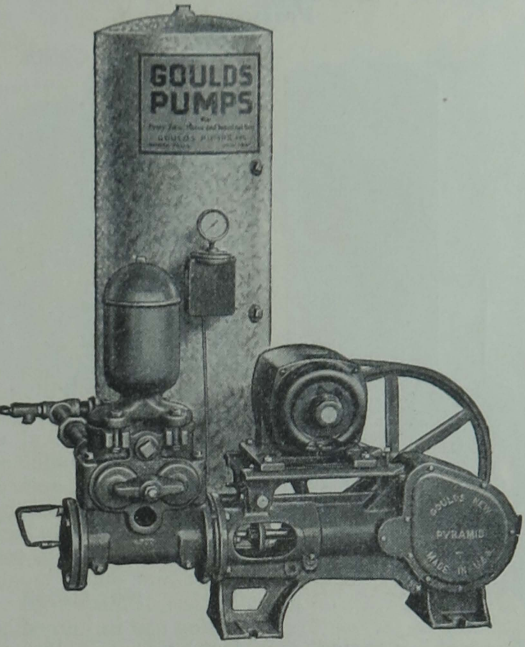
Open Tank Service

Unit No.	With Motor Each	Less Motor Each	Less Tank Including Fittings Each	Cap. Gal. per Hour	Pressure Lbs.	Motor H.P.	Suction and Disch. In.	Wt. Lbs.
P-100-¾-V	$136.50	$91.50	......	1000	43	¾	1½	320
P-100-V	155.50	91.50	......	1000	70	1	1½	335
Pressure Tank Service								
P-100-¾-VA	$142.00	97.00	......	1000	43	¾	1½	325
P-100-VA	161.00	97.00	......	1000	70	1	1½	340
Complete Pressure Tank Systems								
P-100-¾-VAT	$168.00	123.00	......	1000	43	¾	1½	435
P-100-VAT	187.00	123.00	......	1000	70	1	1½	450
Bare Pump Only with Relief Valve and Flat Face or V-Belt Pulley (Motor Support not Included)								
With 17½-Inch Grooved Pulley for V-Belt Drive								
P-100-G	......	$77.50	......	1000	43	¾	1½	240
With 17-Inch Flat Face Pulley								
P-100-F	......	$77.50	......	1000	70	1	1½	240

An extra charge will be made for 115 or 230-volt d.c. motor. In ordering outfits less motor, give complete current characteristics and h.p. of motor to be used.

No. 1813 Goulds New Pyramid Shallow Well Units

Capacities, 600 and 750 Gallons per Hour



Unit No. P-75-VAT

Open Tank Service

The Type V pumping unit consists of automatic-oiling, horizontal, double-acting piston type pump, size 2½x3 inches, with large air chamber, ½ or ¾ horsepower, 60 cycle, 110-220 volts, single phase, repulsion-induction motor mounted on adjustable base; V-Belt drive, air valve and relief valve.

Pressure Tank Service

The Type VA pumping unit is the same as the Type V and with addition of pressure switch with overload and low voltage protection incorporated.

Complete Pressure Tank Systems

The Type VAT pumping unit is a complete storage system with automatic-oiling, horizontal, double-acting, piston type pump, size 2½x3 inches, with large air chamber, ½ or ¾ horsepower, 60 cycle, 110-220 volts, single phase, repulsion-induction motor mounted on adjustable base; V-Belt drive; Goulds improved air valve; 42-gallon galvanized, vertical storage tank with pipe and fittings for connecting to pump discharge when set together; automatic air volume control, pressure gauge, pressure switch with overload and low voltage protection incorporated, and relief valve.

Outfits less motor include adjustable motor mounting, V-Belt, motor pulley. Larger tanks can be furnished at additional cost.

Pumping Units—V Belt Drive

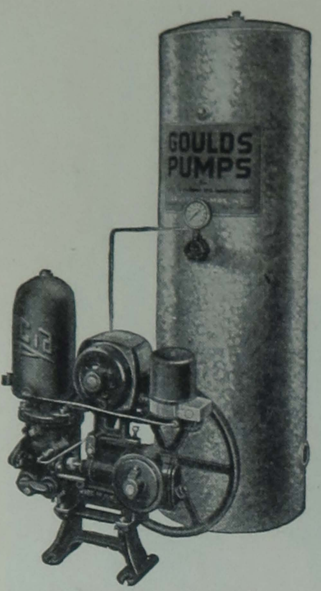
Open Tank Service

Unit No.	With Motor Each	Less Motor Each	Less Tank Including Fittings Each	Cap. Gal. per Hour	Pressure Lbs.	Motor H.P.	Suction and Disch. In.	Wt. Lbs.
P-60-½-V	$91.50	$58.50	......	600	60	½	1¼	220
P-75-½-V	91.50	58.50	......	750	43	½	1¼	220
P-75-¾-V	102.50	58.50	......	750	75	¾	1¼	230
Pressure Tank Service								
P-60-½-VA	$97.00	$64.00	......	600	60	½	1¼	225
P-75-½-VA	97.00	64.00	......	750	43	½	1¼	225
P-75-¾-VA	108.00	64.00	......	750	75	¾	1¼	235
Complete Pressure Tank Systems								
P-60-½-VAT	$121.00	$88.00	$112.50	600	60	½	1¼	335
P-75-½-VAT	121.00	88.00	112.50	750	43	½	1¼	335
P-75-¾-VAT	132.00	88.00	123.50	750	75	¾	1¼	345
Bare Pump Only with Relief Valve and Flat Face or V-Belt Pulley (Motor Support not Included)								
With 12-Inch Grooved Pulley for V-Belt Drive								
P-75-G	......	$50.50	......	600	60	½	1¼	150
P-75-G	......	50.50	......	750	75	¾	1¼	150
With 12-Inch Flat Face Pulley								
P-75-F	......	$50.50	......	600	60	½	1¼	150
P-75-F	......	50.50	......	750	75	¾	1¼	150

An extra charge will be made for 115 or 230 volt d.c. motor. In ordering outfits less motor, give complete current characteristics and horsepower of motor to be used.

Goulds CID Shallow Well Pressure Systems

For Maximum Suction Lift of 22 Feet—43 Pounds Tank Pressure



Nos. C2542 and C3542

No. C2518

A complete system suitable for use where small storage supply is required. Capacity 250 gallons per hour.

Includes CID pump No. C-25; ⅙ h.p., single phase, 60 cycle, 110-220 volt, a.c., or 115 or 230 volt, d.c. motor with pressure switch with overload and low voltage protection incorporated, mounted on adjustable base; V-belt drive; built-in relief valve; air valve; 18-gallon galvanized vertical storage tank, air volume control, pressure gauge; hose and fittings for connecting pump to tank, when pump and tank are installed close together.

No. C2542

For use in homes containing bathroom, laundry and kitchen fixtures or where a small amount of sprinkling is to be done, this outfit with the larger tank is recommended.

Capacity 250 gallons per hour.

Includes CID pump No. C-25, with 42-gallon galvanized vertical storage tank, air volume control, pressure gauge, Goulds improved air valve, pipe and fittings for connecting pump to tank when set together; ⅙ h.p., single phase, 60 cycle, 110-120 volt, a.c., or 115 or 230 volt d.c. motor with pressure switch with overload and low voltage protection incorporated, mounted on adjustable base.

No. C3518

Same as No. C2518 but with pump of larger capacity and equipped with ¼ h.p., single phase, 60 cycle, 110-220 volt, a.c., or 115 or 230 volt d.c. motor.

Capacity 350 gallons per hour.

No. C3542

Same as No. C2542 but with pump of larger capacity and equipped with ¼ h.p., single phase, 60 cycle, 110-220 volt, a.c., or 115 or 230 volt d.c. motor.

Capacity 350 gallons per hour.

No. C5042

Capacity 500 gallons per hour.

Complete outfit consists of CID pump No. C-50, with air valve and relief valve; ⅓ h.p., single phase, 60 cycle, 110-220 volt a.c., or 115 or 230 volt d.c. motor with pressure switch with overload and low voltage protection incorporated; V-belt drive; 42-gallon galvanized vertical storage tank with pipe and fittings for connecting to pump discharge when set together; automatic air volume control and pressure gauge.

Unit No.	Complete Each	Ftgs. Inc. Air Vol. Con. & Press. Gauge Each	†Ftgs. Only Each	Cap. Gals. per Hr.	Motor H.P.	Suction and Disch. In.	Tank Cap. Gals.	Floor Space *Inches Pumping Unit	Floor Space *Inches Tank	Wt. Lbs.
C2518	$62.85	$4.00	$1.10	250	⅙	¾	18	11x23x26	12x36	170
C2542	71.00	6.15	3.00	250	⅙	¾	42	11x23x26	16x48	205
C3518	67.35	4.00	1.10	350	¼	1¾	18	11x24x26	12x36	177
C3542	75.00	6.15	3.00	350	¼	1¾	42	11x24x26	16x48	212
C5042	104.00	6.90	3.75	500	⅓	1	42	16x29x25	16x48	285

*The last dimension is the height.

†Not including air volume control and pressure gauge.

An extra charge will be made for 115 or 230 volt d.c. motor.

A larger tank will be furnished when size is specified, at an additional cost.

Where a 32 volt motor is desired, the next larger size motor than listed will be supplied at an extra charge.

Goulds Complete Deep Well Water Systems

For Pressure Tank Service, Single or Double-Acting Cylinders, V-Belt Drive

No. 8149VAT

Deep well water systems should be used where the vertical distance from the pump location to the lowest water level will exceed 22 feet.

Designed for farm and rural general water supply, irrigation, dairies and creameries, country schools, clubs, and road stands. Also used by large industrial plants within city limits to supply fresh drinking water throughout their establishments.

Outfits consist of automatic-oiling deep well pumping unit with adjustable motor mounting; air pump; 42-gallon galvanized tank, automatic air volume control, pressure switch, pressure gauge, 2-way union check valve, relief valve and galvanized piping for connecting pump and tank when set together; and motor for 110–220 volts, 60-cycle single-phase a.c., or 115 or 230 volts d.c.

No. 8149VAT—9-Inch Stroke

With 1 H.P. Motor, Top Mounting

Regular suction tapping, 3-inch pipe. Special suction tapping, 3½ or 4-inch pipe, at extra price.

Discharge tapping, 2-inch pipe.

Well rod threaded U.S. standard, ¾ inch.

No. **8149**VAT Complete	each	**$210.00**
No. **8149**VATF with Anti-Freeze Complete	each	**220.00**

No. 8146VAT—6-Inch Stroke

With ⅓ H.P. Motor, Top Mounting

Regular suction tapping, 2½-inch pipe.

Discharge tapping, 1¼-inch pipe.

Well rod threaded U.S. standard, ½ inch.

No. **8146**VAT Complete	each	**$115.00**
No. **8146**VATF with Anti-Freeze Complete	each	**119.00**

No. 78212VAT—12-Inch Stroke

With 1½ H.P. Motor, Side Mounting

Regular suction tapping, 4-inch pipe.

Discharge tapping, 3-inch pipe.

Well rod threaded U.S. standard, ¾ inch.

No. **78212**VAT Complete	each	**$281.50**
No. **78212**VATF with Anti-Freeze Complete	each	**293.50**

Note.—Outfits do not include cylinders or well rod.

When ordering, specify voltage, cycles and phase of motor, and whether a.c. or d.c.

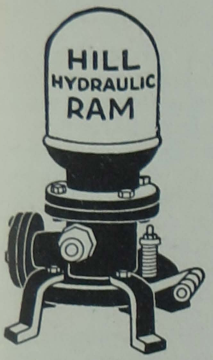
These outfits can also be furnished with motors for other horsepowers or without motor; also without tank or with tank larger than 42 gallons.

Water System Selection Chart

On pages following are shown charts from which a selection can be made of the most economical system for various capacities and cylinder depths.

Equipment included is specified with the list price complete. All that is necessary is to add the price of the drop pipe required.

Hill Hydraulic Rams



The Hill Ram pumps water by means of the force obtained from water flowing into it through an inclined pipe. It uses the energy of the moving water to raise a quantity of this water to a higher level. It will pump water up to heights of over 500 feet, into pneumatic pressure tanks, for long distances.

All that is required is that the ram be installed at a point somewhat lower than a source at which you may tap a water supply, which may be a flowing well, pond, lake, river, spring, stream, irrigation ditch, etc. The installation is simple. The minimum fall for a ram installation is 2 feet.

Size of Ram Inches	Each	Gallons Required per Min.	Weight Pounds
3	**$88.00**	30 to 70	255
4	**125.00**	60 to 140	375
6	**366.75**	220 to 350	890
8	**623.50**	400 to 630	1600
10	**889.00**	790 to 955	2450
12	**1066.75**	1190 to 1435	3460

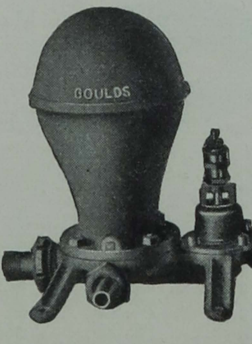
In each case, the size of the ram is the size of the intake pipe. The delivery pipe size of the 1¼-inch ram is ¾ inch. In every other instance, the delivery pipe is ½ the size of the intake.

Double Acting Rams

If the available supply of pure water is too small to provide enough force for a regular Hill Ram, a Hill Double Acting Ram can pump the pure water with power supplied by undrinkable water from a spring, creek, or stream. This machine absolutely prevents the mixing of the impure with the pure water. Made to special order only.

Size of Ram................inches	**3**	**4**	**6**
Each..........................	**$140.00**	**205.00**	**470.00**

Goulds Improved Hydraulic Rams



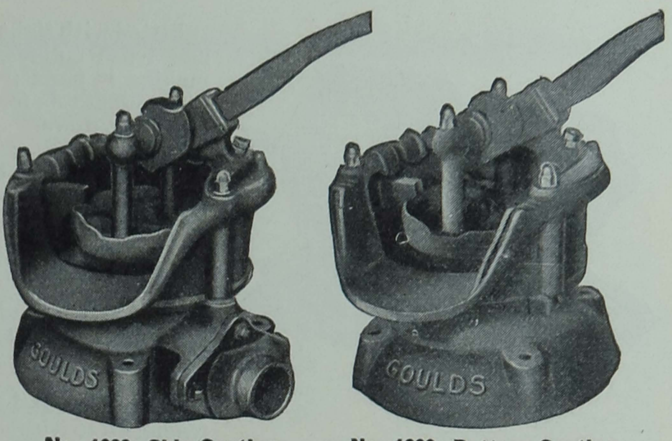
The hydraulic ram is a self-acting pump which utilizes the momentum of a fall of water to force a part of the water to an elevation many times as high as the fall used to operate the ram. The simplicity, effectiveness and durability of this machine make it one of the most useful as well as the most economical of the equipments available for forcing water to distant and elevated points.

A slight fall only is required to operate the ram, but as the height of fall is increased its operation becomes more powerful, and it will force the water in a proportionately larger flow or to a proportionately higher elevation. The amount of water delivered, or the proportion of the water raised to the amount wasted in operating the ram, varies with the amount of fall and height to which it is elevated. An increase in the available fall or a decrease in the height the ram has to elevate the water will cause a corresponding increase in the amount of water delivered by the ram.

Ram has rubber disc valve on bronze grid seat with cylindrically wound spring below air chamber.

No.	Size No.	Supply Gallons per Minute to Operate Ram	Pipes, In. Drive	Pipes, In. Discharge	Approx. Weight Pounds	Price Each
1702	3	2 to 4	1	½	35	**$16.75**
1702	4	3 to 7	1¼	¾	53	**21.50**
1702	5	6 to 12	2	1	94	**29.00**
1703	6	11 to 20	2½	1¼	165	**51.00**

Goulds Diaphragm Suction Pumps



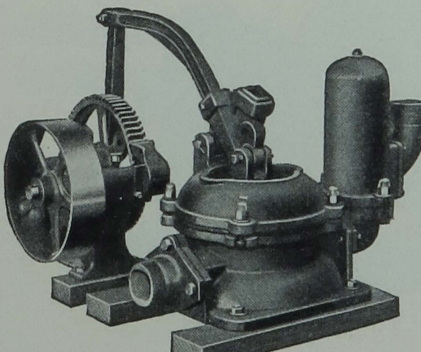
No. 1223, Side Suction **No. 1222, Bottom Suction**

For suction lift of 25 feet.

The diaphragm is made of the best quality of rubber and is guaranteed to stand hard service. The suction valve is of metal, rubber faced and easily removable. It rests on an inclined seat and therefore offers the least obstruction to the passage of semi-fluid or solid matter. The waterways are large and permit an easy flow of fluid. The lever is made of wrought iron and is reversible; it can be used vertically or horizontally from either side or the back of the pump. This is the type most widely used by contractors and builders who have to pump out excavations.

Size No.	Stroke In.	Suction I.P. In.	Approx. Cap. per Hour Gal.	No. 1222 Approx. Wt. Lbs.	No. 1222 Price Each	No. 1223 Approx. Wt. Lbs.	No. 1223 Price Each
2	3	2½	1800	115	**$20.50**	127	**$22.50**
3	3	3	3500	170	**25.00**	178	**27.00**
4	4	4	6000	256	**40.00**	266	**44.00**

No. 1763 Goulds Diaphragm Lift and Force Pumps



Pump Connected to Jack

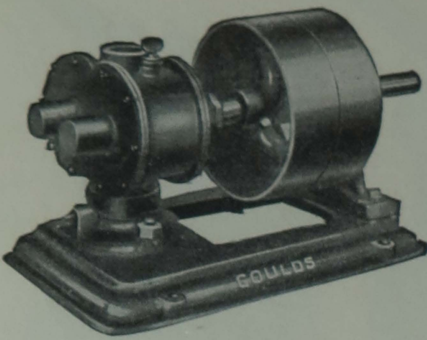
In trenches, quarries and other excavations which are too deep for a lift pump, this pump can be placed in the bottom of the excavation and the water or sewage forced to the top by using either pipe or hose discharge or pipe can be run to the gutter or other point.

Hand lever furnished unless power lever is specified. Can be used vertically or horizontally from either side or the back of the pump. Both hand and power levers can be furnished at extra charge.

Number..	**3**
No. **1763** Pump Only.....................each	**$46.00**
Rubber Diaphragms........................each	**2.00**
No. **1589** Pump Jack Only..................each	**18.00**
Stroke......................................in.	3
Capacity per Stroke.........................gals.	0.8
Speed Recommended for Power Drive......r.p.m.	35 to 50
Suction Pipe or Hose........................in.	3
Discharge Pipe or Hose......................in.	3
Discharge Head..............................ft.	15
*Total Lift and Force........................ft.	30
Weight......................................lbs.	198

*Total lift and force from supply to point of delivery.

No. 1281 Goulds Power Rotary Pumps



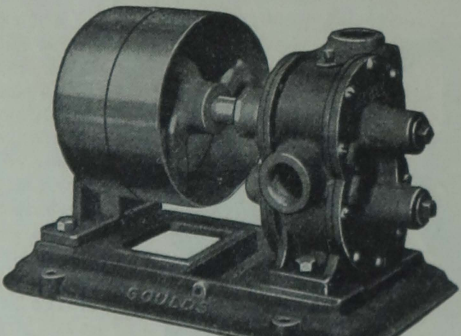
Fitted with tight and loose pulleys, making it particularly adaptable for line shaft drive.

Capacities are at 100 r.p.m. for maximum heads of 100 feet. Speeds of 200 r.p.m. recommended but satisfactory service may be had at speeds up to 300 r.p.m.

Case accurately machined to within limits of 1/1000 inch. Cams machined and bored to give perfect alignment of cam shafts. Screw type gland, easily accessible. Priming and drain plugs conveniently located on each pump. Surface and gland packings designed to withstand action of kerosene, gasoline, fuel oil, etc. Bronze pump has all parts coming in contact with the liquid of bronze.

No.	Iron Each	Bronze Case and Cams Each	Bronze Each	Cap. per Min. 100 Rev. Gals.	Suction Pipe In.	Discharge Pipe In.	Tight and Loose Pulleys In.	Approx. Wt. Lbs.
1	$18.50	$37.25	$44.00	10	1½	1¼	8x2½	66
2	20.50	41.00	48.50	12½	1½	1¼	8x2½	73
3	22.50	45.00	53.50	14	1½	1½	8x2½	78
4	39.50	73.50	93.00	25	2	2	12x3½	137
5	44.00	85.00	97.50	27½	2	2	12x3½	146
6	73.50	117.50	137.50	32½	2½	2½	24x4	300

No. 1785 Goulds Power Rotary Force Pumps



An improved pump with cams located one above the other instead of beside each other as has been the usual practice. This construction makes the pump more adaptable to any installation for the suction opening is on one side and the discharge connection may be made at either top or side. A plug is furnished for the opening not used. This arrangement makes piping simple and accessible.

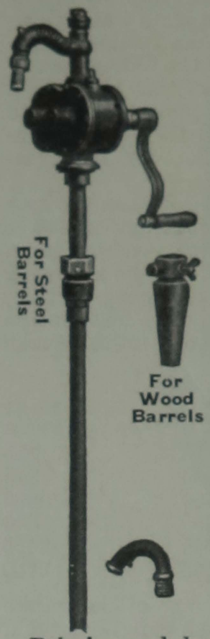
Packing of material to withstand action of such oils as kerosene, gasoline, fuel oil and distillate.

This pump is furnished without spout.

Number		1	2	3
Iron	each	$20.00	$22.50	$24.50
Bronze Case and Cams	each	53.50	58.50	68.50
Bronze	each	59.00	63.50	73.50
*Cap. at 100 R.P.M.	gals.	10	12½	14
Suction Pipe	in.	1½	1½	2
Discharge Pipe	in.	1½	1½	2
Tight and Loose Pulleys	in.	8x2½	8x2½	8x2½
Discharge Head	ft.	100	100	100
Approx. Weight	lbs.	66	73	78

*Capacity increases in same ratio as the speed.

No. 464 Goulds Hand Rotary Force Pumps



Every public garage, oil station, oil wholesaler and many private garages can use this design of rotary pump made especially for pumping from barrels.

The barrel attachment is adjustable so that it can be moved up or down on the suction pipe and is threaded so that it can be used in steel barrels.

In wood barrels the pump can be further secured by forcing the sharp ends of the suction pipe into the bottom of the barrel.

The cams are accurately machined and bored to give perfect alignment of the cam shafts.

Has screw type gland. The spout is fitted with ¾-inch female hose coupling. Top of spout is threaded for iron pipe and capped. Hose hook furnished only when ordered, no extra charge.

Adjustable barrel attachment (for steel barrels) furnished regularly. Attachment on Nos. 1 and 2 pumps have 2 threads, one to fit 1½-inch and the other to fit 2-inch gas pipe thread. No. 3 size will fit only 2-inch.

Priming and drain plugs are conveniently located on each pump. It has no valves. All surface and gland packing are of special material to withstand the action of kerosene, gasoline, fuel oil and distillate.

Size No.	Cap. per Min. 100 Rev. Gal.	Suction Pipe In.	Discharge, In. End of Spout Hose	Discharge, In. Top of Spout Pipe	Approx. Wt. Lbs.	Price, Each Iron	Price, Each Bronze
1	10	1	1	1	41	$14.50	$41.00
2	12½	1	1	1	46	15.00	46.00
3	14	1¼	1¼	1¼	53	17.50	51.00

No. 702 Standard Cup Leathers

Made from carefully selected oak tanned stock and recommended for ordinary use.

Packed 1 dozen in a carton.

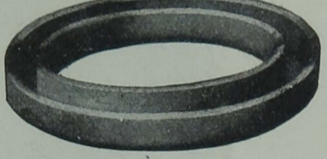
Size Inches	Per Gross	Size Inches	Per Gross	Size Inches	Per Gross
1	$7.50	2	$20.00	4¼	$68.00
1⅛	8.50	2¼	21.50	4½	75.00
1¼	9.50	2½	26.00	4¾	85.00
1⅜	11.00	2¾	29.00	5	95.00
1½	13.00	3	32.50	5¼	100.00
1⅝	15.00	3¼	39.00	5½	108.00
1¾	17.00	3½	48.00	5¾	118.00
1 13/16	18.50	3¾	54.00	6	128.00
1⅞	18.50	4	62.00	...	......

No. 700 Lower Valve Leathers

Outside Diam. Inches	Per Gross	For Cylinder Inches	Outside Diam. Inches	Per Gross	For Cylinder Inches
2	$10.00	1½	4½	$47.50	4
2¼	12.00	1¾	5	52.50	4¼
2½	14.50	2	5¼	60.00	4½
2¾	18.00	2¼	5¾	80.00	5
3	21.00	2½	6¾	115.00	6
3¼	25.00	2¾	7¾	160.00	7
3½	27.50	3	8¾	200.00	8
3¾	33.00	3¼	9¾	240.00	9
4	37.50	3½	10¾	300.00	10
4¼	42.50	3¾	....	......	....

Hydraulic Leather Press Ram Crimps

For Cotton and Cotton Seed Oil Press Rams



This crimp is manufactured especially for the severe duty of packing the rams on cotton presses and cotton seed oil presses.

For this service the best is none too good. It therefore is advisable to pay a little more for a first class leather packing as the cost is but a small item compared to the cost, loss of time and annoyance of replacing.

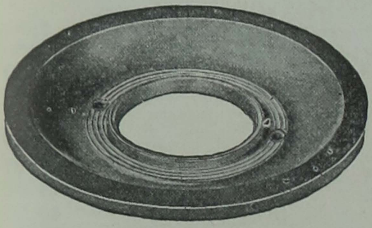
Cotton Press Ram Crimp

Price, 7¼-inch, Inside Diameter................each ....
" 8⅜ " " " .... " ....

Cotton Seed Oil Press Ram Crimp

Price, 16-inch, Inside Diameter.................each ....

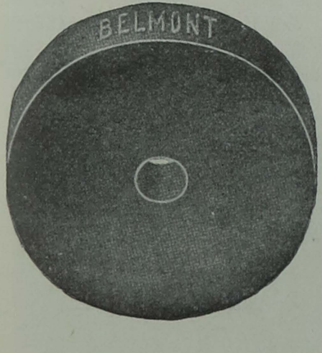
Rubber Pump Diaphragms



The diaphragms listed below are made in proper sizes and proportions, and of stock that has proved the most satisfactory for use in hand-operated pumps for the pumping of water from cellars, sewers, excavations, etc. Gould and Edson diaphragms; No. 2, outside diameter, 11¼ inches; hole, 4 inches; No. 3, outside diameter, 13 inches; hole, 5 inches; No. 4, outside diameter, 15 inches; hole, 5½ inches. Loud Diaphragms: No. 1, outside diameter, 10 inches; hole, 4½ inches; No. 2, outside diameter, 13¼ inches; hole, 5¾ inches.

Prices upon application.

Belmont Pump Valves



Made in all sizes and shapes, of various qualities and degrees of hardness for hot and cold water, salt water, oil, etc.

Orders should specify diameter, thickness, and size of hole, and designate Style No. State if the valves are for use in hot, cold, clear or gritty water, oil, acid, syrup or other liquid, and give maximum pressure under which used and maximum temperature.

Style No.	Color	Density	Pressure Pounds	Temperature	Service
1005	Gray	Soft	75	150°	Cold or Warm Water
1020	Black	Semi-Soft	125	170°	Cold or Warm Water
1025	Gray	Semi-Soft	125	150°	Cold or Warm Water
1060	Gray	Semi-Hard	175	170°	Cold or Warm Water
1070	Black	Semi-Hard	150	170°	Cold or Warm Water
1085	Black	Semi-Hard	150	175°	Cold or Warm Water
1200	Black	Hard	300	212°	Hot Water
1240	Black	Hard	250	212°	Hot Water
1305	Gray	Soft	50	170°	Condensor & Marine
1330	Gray	Soft	50	170°	Condensor & Marine
1405	Red	Soft	50	170°	Cold or Warm Water

Galvanized and Polished Steel Pump Rod

Price, ⅜-inch, Random Lengths............ per ft. **$.08**
" 7/16 " " " .... " **.08**
" ⅜ " Fitted...................... " **.05**
" 7/16 " " .... " **.06**

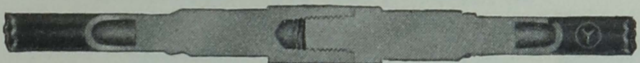
Made of stiff steel and drawn to 1/1000 part of an inch, in 20-foot lengths.

Octagon Wood Pump Rods

Wood pump rods are made of the best quality selected ash, and are furnished in random lengths of about 17 to 20 feet, unless otherwise specified.

Size of Rod Inches	Blank per 100 Feet	Fitted with Forged Sucker Rod Couplings per 100 Feet	Galv. Forged Sucker Rod Couplings and Copper-Rivets per 100 Feet	Adpated for Working Barrels Diameter Inches
1⅛	$9.00	$13.50	$15.00	1⅜ to 2¼
1⅝	16.00	22.50	25.00	2¼ to 2¾
1⅞	21.00	30.60	34.00	2¾ to 3¾
2¼	47.00	63.00	70.00	3¾ to 5¾
3½	95.00	135.00	150.00	5¾ to 8¾

Airtite Steel Pump Rods



This is a hollow rod, and the dry air compartment throughout the length of each rod makes it semi-floating and reduces the strain on the pump piston. Steel couplings are electrically welded into the rod.

No.	Per 100 Feet Black	Per 100 Feet Galv.	Pin In.	Corresponding Size Wood Rod, In.	O.D. Inches	I. D. Inches	Wt., Lbs. per 100 Ft.	Approx. Ft. to a Bundle
1	**$10.00**	**$14.00**	⅝	1⅛	1 1/32	.493	60	200
2	**15.50**	**21.00**	⅞	1⅜, 1⅝	1 7/16	.824	122	120
3	**24.00**	**31.00**	1	1⅞	1 9/16	1.049	180	100
4	**32.00**	**42.00**	1⅛	2¼	1 15/16	1.380	250	60
5	**60.00**	**78.00**	1½	3, 3½	2½	2.067	415	20

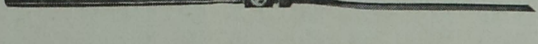
Wood Rod Couplings

Two, Three or Four-Hole

These couplings are made with a socket for the ends of the rod to be driven into, to prevent splitting.

No.	For Rods Inches	No. Holes	Pipe Thread Inches	Black per Set	Galvanized per Set
432	1 and 1⅛	2	⅜	**$.44**	....
432	1 and 1⅛	2	⅜	...	**$.48**
435	1 and 1⅛	3	⅜	**.60**	**.66**
436	1¼ and 1⅜	3	½	**.90**	**1.00**
437	1½ and 1¾	4	¾	**2.25**	**2.85**

Forged Sucker Rod Couplings



These couplings are forged, have straight box and pin same sizes as oil-well couplings and are interchangeable with them.

No.	Size Box and Pin Inches	No. Thds. to the Inch	Size Wood Rod Inches	For Working Barrels Diam. Inches	Price, per Set Black	Price, per Set Galv.
408	⅝	12	1⅛	1⅜ to 2¼	**$.90**	**$1.10**
409	⅞	10	1⅝	2¼ " 2¾	**1.30**	**1.60**
410	1	10	1⅞	2¾ " 3¾	**2.00**	**2.50**
411	1⅛	8	2¼	3¾ " 5¾	**3.20**	**4.00**
413	1½	8	3½	5¾ " 8¾	**8.00**	**10.00**

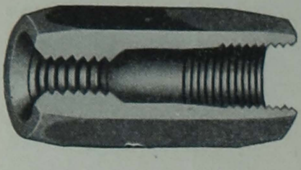
Hexagon Steel Pump Rod Couplings

YOUNGSTOWN

Bar stock. Ends tapped straight, reamed and tapered. Cadmium coated. Sizes, 3/8x3/8, 7/16x7/16, 1/2x1/2, 3/8x7/16, 3/8x1/2, 7/16x1/2 inches. Packed 25 to a box.

Per Box.. $1.50

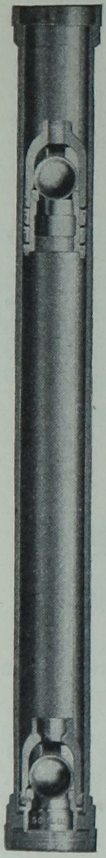
No. 438 Reducer Couplings



For 1/2 and 3/8-inch pipe and steel pump rods. Female, both ends.

Size Pipe Inches	Size Rod Inches	Galv. Each
3/8	3/8	$.20
3/8	7/16	.20
1/2	3/8	.30
1/2	7/16	.30

No. 904 Goulds Brass Artesian Deep Well Cylinders



With Ball Valves

A ball valve cylinder that will give satisfactory, all-around service.

Working barrel or cylinder is of seamless drawn brass tubing with cast bronze top and bottom attachments threaded for iron pipe connections.

Plunger and check are of bronze, with bronze ball valves. Plunger is packed with special hydraulic leather crimps.

Suction pipe and strainer may be attached at the bottom.

Valves are easy to remove. The plunger and suction valves can be removed and replaced through the connecting pipe, which is of larger diameter than the bore of the cylinder. By turning the plunger rod to the right, the plunger will pick up the suction valve, the top of which is threaded to fit the lower end of the plunger, and both can be withdrawn together.

For convenience in shipping, the plunger and suction valve are screwed together. They must be disconnected before cylinder is lowered into the well. Wood sucker rods with forged couplings are recommended for these cylinders.

Sucker rods and couplings are furnished at extra cost.

I.D. In.	Each	Stroke Inches	Displacement per Stroke Gallons	Usual Speed and Displacement per Minute Revs.	Usual Speed and Displacement per Minute Gal.	Dimensions Inches Length Pump Chamber	Dimensions Inches Max. Outside Diam. Caps.	Top and Bottom Connecting Pipe Inches	Size Wood Sucker Rod Inches	Wt. Lbs.
1 3/4	$14.20	10	.104	35	3.6	26	2 7/8	2	5/8	11
1 3/4	14.25	12	.125	30	3.7	28	2 7/8	2	5/8	12
2 1/4	20.50	10	.172	35	6.0	26	3 1/2	2 1/2	5/8	14
2 1/4	21.50	12	.206	30	6.1	28	3 1/2	2 1/2	5/8	15
2 3/4	25.50	10	.257	35	8.9	26	3 7/8	3	7/8	19
2 3/4	26.25	12	.309	30	9.2	28	3 7/8	3	7/8	20
3 1/4	36.00	10	.359	35	12.5	30	4 1/2	3 1/2	1	35
3 1/4	37.25	12	.431	30	12.9	32	4 1/2	3 1/2	1	36
3 3/4	51.75	10	.478	35	16.7	34	5 1/8	4	1 1/8	53
3 3/4	52.50	12	.574	30	17.2	36	5 1/8	4	1 1/8	55
4 3/4	95.50	10	.767	35	26.8	34	6 1/4	5	1 1/2	125
4 3/4	97.50	12	.920	30	27.6	36	6 1/4	5	1 1/2	126
5 3/4	138.50	10	1.124	35	39.3	34	7 1/4	6	1 1/2	170
5 3/4	142.00	16	1.798	30	53.9	36	7 1/4	6	1 1/2	175

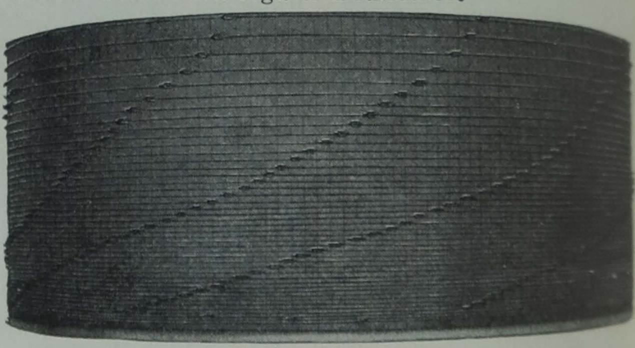
Redwood Water and Oil Tanks

Without Covers—With Round Adjustable Steel Hoops

Made from 2-inch clear air-dried redwood.

Capacity, Gallons Nominal	Capacity, Gallons Actual	Outside Dimensions, Feet Diameter	Outside Dimensions, Feet Height	Shipping Wt., Lbs.	Price Each
150	154	3	3 11/12	243	$19.00
285	288	4	3 11/12	343	23.00
369	369	4	4 11/12	412	30.00
500	463	5	3 11/12	425	28.00
750	751	5 7/12	4 11/12	580	35.00
1000	1033	6 1/2	4 11/12	655	45.00
1000	1066	6	5 11/12	655	45.00
1500	1471	7	5 11/12	830	53.00
2000	1940	8	5 11/12	975	60.00
2500	2291	8	6 11/12	1145	70.00
3000	2923	9	6 11/12	1270	80.00
4000	4187	10	7 11/12	1555	100.00
4000	3818	9	8 11/12	1580	100.00
5000	5092	11	7 11/12	1745	115.00
5000	4743	10	8 11/12	1790	115.00
6000	6086	12	7 11/12	2010	125.00
7000	6895	12	8 11/12	2160	140.00
8000	7703	12	9 11/12	2375	155.00
10000	10048	13 2/3	9 11/12	2770	185.00

All prices for tanks complete, K. D. The above tanks are standard sizes. Tanks with special dimensions manufactured if desired. Plain water register is furnished.

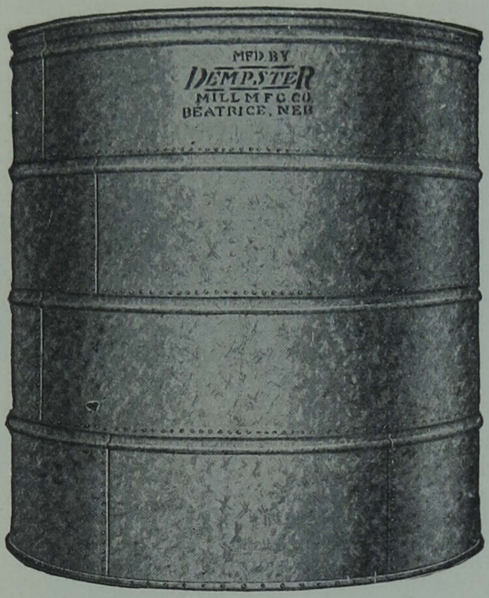


Made from 3-inch clear air-dried redwood.

Capacity Gallons	Capacity Bbls. 42 Gal.	Out. Diam. Ft.	Out. Diam. In.	Out. Height Ft.	Out. Height In.	Shipping Wt., Lbs.	Price Each
10000	238	14	....	9	11	4660	$314.00
12000	285	14	....	11	11	5370	356.00
15000	357	15	6	11	11	6080	415.00
20000	476	18	....	11	11	7350	484.00
25000	593	18	....	13	11	8330	550.00
30000	714	20	....	13	11	9600	640.00
40000	952	23	....	13	11	11650	770.00
50000	1190	24	....	15	11	13700	960.00
60000	1428	26	....	15	11	15400	1170.00
70000	1666	28	....	15	11	17100	1210.00
80000	1904	30	....	15	11	18900	1340.00
90000	2142	30	....	17	11	21000	1500.00
100000	2380	30	....	19	11	22500	1650.00

Prices for tanks complete, K. D. Tanks are standard sizes. Tanks of all sizes up to 1000000-gallon capacity and tanks of special shapes to order. Prices on outlet connections or other fittings named on receipt of details.

Storage Tanks

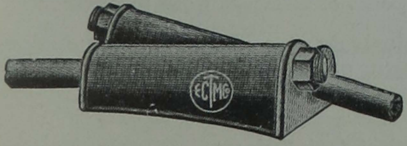

MFD. BY
DEMPSTER
MILL MFG. CO.
BEATRICE, NEB.

Tanks are made of heavy coated galvanized steel. A ½-inch pipe is rolled in the top. A heavy corrugation will be found just below each horizontal seam. Add to this an angle iron bottom and the Dempster Storage Tank will serve best.

Storage tanks can be furnished in sizes up to 12x12 feet and in 20 to 16-gage iron. The standard tap for storage tanks is ¾-inch pipe placed in the side, close to the bottom. Additional taps may be had as follows: ½-inch or smaller, 50 cents each; ¾ to 1 in., 75 cents each; 1¼ to 2 in., $1.00 each.

Prices are for 20-gage; for 18-gage add 30 per cent and for 16-gage add 60 per cent.

No.	Each	Diameter Feet	Height Feet	Capacity Barrels	Weight Pounds
S34	$32.50	3	4	5¾	90
S36	44.00	3	6	8¾	125
S44	39.70	4	4	10¾	125
S46	55.10	4	6	16¼	165
S48	70.50	4	8	21¾	208
S55	56.00	5	5	21¾	170
S56	64.80	5	6	26	185
S58	82.40	5	8	34¾	240
S510	100.00	5	10	43½	280
S66	76.50	6	6	38	265
S68	96.40	6	8	53	330
S610	116.30	6	10	67¼	365
S86	113.50	8	6	71½	440
S88	139.30	8	8	95¼	525
S810	165.00	8	10	119¼	615
S108	183.20	10	8	149	635
S1010	214.50	10	10	186½	780
S128	234.00	12	8	214¾	945
S1210	273.00	12	10	268½	965
S1212	321.80	12	12	322¼	1125



Tecktonius Malleable Iron Side Pull Fasteners

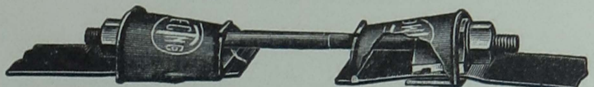
For Round Iron

For tanks, vats, silos, etc.

Size Fastener Inches	Length Over All Inches	Weight Pounds 100 Pieces	No. Pcs. Packed in Barrel	Price, Each: Natural Finish	Price, Each: Electro-galv.
⅜	3¼	56	800	$.08	$.11
½	4	74	600	.10	.14
⅝	4⅜	104	500	.12	.18
¾	4½	140	350	.17	.24
⅞	5⅝	229	220	.27	.39
1	5¾	254	180	.30	.43
1⅛	6⅜	364	115	.45	.63
1¼	6⅝	462	100	.57	.70
1⅜	7½	696	80	.87	1.22
1½	7½	626	80	.80	1.12

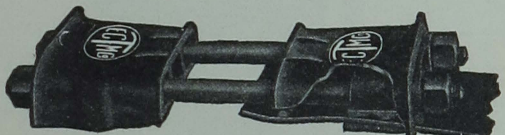
Tecktonius Malleable Iron Tank Hoop, Band and Plate Fasteners

Single Bolt Fasteners



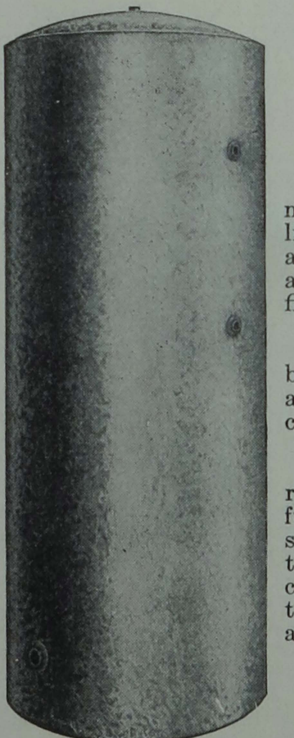
Size Fastener Inches	Size Bolt Inches	Weight Pounds with Bolt	Price, per Pair: With Bolt: Natural	With Bolt: Galv.	Without Bolt: Natural	Without Bolt: Galv
1	7/16x10	1⅜	$.35	$.45	$.22	$.30
1¼	½x13	2⅛	.40	.50	.25	.35
1½	½x13	2 3/16	.40	.55	.27	.37
*1½	⅝x14	3	.50	.60	.32	.42
1¾	½x13	3	.50	.65	.36	.48
*1¾	⅝x14	4	.60	.80	.45	.58
2	⅝x14	4	.60	.80	.45	.58
*2	¾x18	6 1/16	.80	1.10	.60	.78
2½	⅝x16	5⅝	.80	1.10	.65	.85
*2½	¾x18	6½	1.00	1.35	.80	1.00
3	¾x18	7 1/16	1.00	1.35	.80	1.00
*3	⅞x18	8⅜	1.50	1.90	.90	1.25
3½	⅞x18	9 11/16	1.50	2.00	.90	1.35

Double Bolt Fasteners



Size Fastener Inches	Size Bolt Inches	Weight Pounds with Bolt	Price, per Pair: With Bolt: Natural	With Bolt: Galv.	Without Bolt: Natural	Without Bolt: Galv
4	¾x18	14⅛	$2.00	$2.75	$1.45	$2.00
4½	¾x18	16⅜	2.50	3.35	1.70	2.50
5	⅞x18	19½	3.00	4.00	1.90	2.75
*5	⅞x18	20⅛	3.00	4.00	1.90	2.75
5½	⅞x20	22½	3.25	4.35	2.15	3.00
*5½	1 x20	28⅜	4.00	5.45	2.75	3.75
6	⅞x20	24⅜	3.50	4.75	2.50	3.40
*6	1 x20	30 1/16	4.00	5.50	3.15	4.00

*Extra heavy. Always give width and thickness of band the fasteners are to connect.



Goulds Pressure Storage Tanks

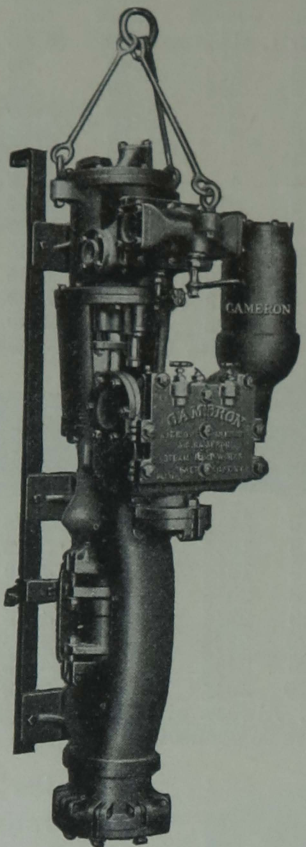
A 42-gallon tank is most commonly used as it supplies a reliable air cushion for the pump and the pressure switch to operate against. This size also seems to fit most conditions.

Larger tanks are more expensive but their use allows fewer starts and stops, and greater storage capacity to meet peak demands.

Where tanks of a larger size are required than the 42-gallon size furnished with the complete water systems, deduct from the price of the complete system, $12.00, the cost of a 42-gallon tank, and add the price of the size tank desired, as given in the table below.

Size In.	Black Each	Galv. Each	Capacity Gallons	Inlet In.	Discharge In.	Wt. Lbs.
12x 36	......	$7.50	18	1¼	¾	57
16x 48	$10.25	12.00	42	1¼	1½	102
20x 60	16.25	19.50	82	1½	1½	166
24x 60	20.50	24.25	120	2	2	222
30x 60	35.50	42.00	180	2	2	355
30x 72	41.00	48.50	220	2½	2½	390
36x 72	59.75	89.00	315	2½	2½	540
36x120	89.00	109.00	530	3	3	780

Type VPS Cameron Vertical Plunger Sinking Pumps



This vertical plunger sinking pump is one of the most successful sinking pumps on the market.

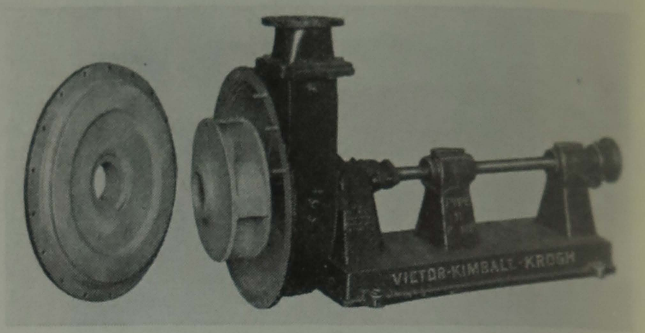
Any steam pump that is to be used in sinking a mine shaft must be strong, certain in operation, capable of handling gritty water, require little attention, and above all, be able to stand the roughest kind of usage without sustaining injury.

This pump retains all the advantages of the horizontal types of Cameron Pumps besides having several features of importance for a sinking pump. It has no exposed parts liable to breakage; it takes up less room in the shaft than any other make of pump; it cannot be damaged by collision with the side walls; it is not likely to be injured by blasts; and it is designed and intended to handle gritty water.

No.	Diam. Steam Cyl. In.	Diam. Plunger In.	Stroke of Piston In.	Rating (Must be Reduced 20 per cent if Suction Lift is High) G.P.M.	Piston Speed	Size, Inches Steam Pipe	Ex-haust Pipe	Suc-tion Pipe	Dis-charge Pipe	Shaft Space In.	Wt. Lbs.
6	8	4	12	83	128	1	1½	3	2½	25 x25	1500
7	10	5	13	130	128	1¼	2	4	3	31 x30	2300
9A	12	5	13	130	128	1½	2½	4	3	32 x31	2500
9	12	7	13	206	103	1½	2½	5	4	34½x34	3200
10B	14	7	13	206	103	2	3	5	4	37¼x37	3800
12	18	9	16	247	75	3	4	6	5	45 x38¾	5900
11C	16	10½	16	427	95	2½	4	8	6	52 x62	6000
12B	18	10½	16	427	95	3	4	8	6	52 x62	6200

Prices upon application.

Kimball-Krogh Dredge Pumps



Designed to handle water containing large solids and gritty materials; such as gravel, rock, sand, mud and other substances. For adaption to all kinds of suction dredge work, deepening of river and bay channels, loading sand and gravel into barges, dredging of shells for fertilizer, raising of gold-bearing sands and gravel to sluice boxes, in fact, for any heavy duty pumping work where it is required to pump large solids with water or liquids.

Pump has casing of square cross-section type, which design permits use of greater width in impellers, capable of passing larger solids without danger of clogging pump.

Produced entirely with the idea of constructing a strong pump of extra heavy design, fully protected internally with liners of extra-hard materials which can be quickly and economically replaced when worn.

Completely lined on inside of casing with hard liners, ground to correctly fit. Liners are designed in sections so that only the particular worn part of liner requires replacement.

Impeller is of heavy construction, having thick vanes and side walls, dependent upon character of work to be performed. Constructed of hard alloy, chrome steel or flint iron. Design of impeller provides wide passages to permit easy handling of large gravel and rock up to approximately 75% of diameter of suction inlet.

No wearing ring, or back hub, is provided on dredge pump impeller, thus eliminating one of the greatest causes of wear. Due to liner construction, wearing rings are unnecessary.

Centered in suction opening is wear nozzle, made of extra hard material, ground to a fitting and smooth-surfaced on running joint end. Impeller hub face is also surfaced on running joint end. Impeller hub face is also surfaced to form a close-fitting joint, preventing by-passing of material from high pressure part of pump to low pressure point in suction inlet.

This running joint, formed by wear nozzle and impeller hub, is of course, the point of greatest wear in pump.

Experience has conclusively proved that this running joint will wear almost uniform on both the wear nozzle and impeller hub face.

Size of Pump In.	Approximate Cubic Yards per Solid Material at Specified Percentages			Weight Lbs.
3	10%	15%	20%	700
4	8	12	16	1100
6	15	22	30	2000
8	30	45	60	4500
10	50	75	100	6000
12	100	150	200	8500
15	150	225	300	13500
18	200	300	400	18000
20	325	425	650	23000
	400	525	750	

Prices upon application.

Kimball-Krogh Sand and Tailings Pumps

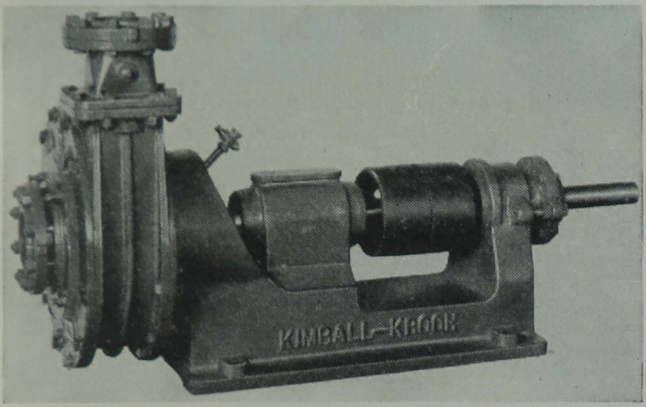
The impeller and all liners of the sand and tailings pump can be readily removed from the shell, or casing, and reinstalled without dismantling the drive end of the pump, and without disconnecting the discharge pipe. The impeller is threaded to the shaft. By unscrewing the impeller, all liners can be removed and replaced without disturbing any other part of the pump.

This wear take-up adjustment consists of 2 adjusting bolts anchored to lugs cast integral with the outer bearing bracket. Two compensating lugs are cast integral with the outer bearing housing, and are secured in place on these adjusting bolts by inside and outside nuts. Position of the bearing housing lugs on the adjusting bolts regulates the running joint formed by the impeller hub against the suction nozzle.

When wear takes place at the running joint it can be taken up in a few minutes' time by loosening the inside nut on bearing housing and tightening the outside nuts.

This simple and positive adjustment moves the outer bearings, shaft and impeller toward the suction nozzle, effecting proper running joint clearance. Adjustment can continue to be made from time to time until the nozzle or impeller hub is completely worn down, when replacement of worn part can be made.

Full-Lined



Shipped with vertical discharge. If desired, the pump can be assembled with the discharge in any wanted position. If the position of the discharge is to be changed after the pump is shipped, unbolt the casing from the back cover and turn casing to the required position of discharge, rebolting into the new position. Do not change position of discharge by unbolting back cover from the base plate. This method necessitates the taking apart of the thrust bearing.

If the material pours or falls into the suction sump, considerable air will be entrained with the liquid. This air entering the pump, will result in reduced capacity; and the pump may become air bound, requiring a shutdown. A pump having a horizontal top discharge will handle this air condition better than any other position of the discharge, because the pump will free itself of the air in the horizontal position.

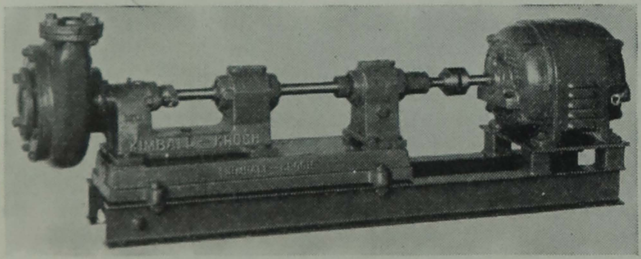
If the pump should become packed full of solids so it cannot be started, turn water under pressure into the pump, gradually working the shaft back and forth with a wrench or bar. This procedure will under ordinary conditions free the pump sufficiently to start it in operation.

Direct-connected pump includes extended base and flexible coupling. Belted pumps include pulley and outboard ball bearing. All pumps are furnished with screwed suction and flanged discharge. All pumps are right hand; that is, the pump rotates clockwise when standing at driving end.

Size of Pump In.	Belted Type Each	Direct-Connected Each	Normal Capacity Cu. Ft. per Hr.	Normal Capacity *Tons per Hr.	Approx. H.P. for Each 10-Ft. Head	Diam. Impeller In.	Belted Drive—Speed, R.P.M. Head, Feet 10	15	20	25	30	35	40	45	50	60	70	80	Approx. Weight Lbs.
2	$466.00	$540.00	16.5	36	1½	9	896	1049	1160	1252	1320	1432	1495	1570	1650	1786	1905	2030	650
3	520.00	620.00	33	72	2	11	665	780	865	940	985	1060	1110	1185	1225	1325	1415	1515	800
4	625.00	720.00	48	105	3	12	611	716	792	845	915	980	1020	1075	1125	1220	1305	1389	1000
6	1160.00	1330.00	135	290	7½	21	280	340	390	435	480	520	550	590	620	680	735	785	1800

*Three parts water to 1 part solids by weight.

Unlined



Designed for either belt or direct connected motor drive. Although the small-sized pump is of the unlined type, those parts subject to the most wear can easily and quickly be replaced at comparatively small cost.

The main casing and face plate are made of cast iron, having very thick walls to provide long wearing service against the gritty materials and solids to be pumped. The size and construction of these small sand pump parts are of such lesser cost that, when worn, they can be replaced at far less than a set of liners could be installed in these particular pumps.

Impeller is made of white iron, extremely hard and is ground to fit into the casing. This impeller is cast with a soft core. This core is bored and threaded to shaft. The impeller can be unscrewed from the shaft and a new one placed on shaft without dismantling the drive end of pump.

Wear nozzle is also made of white iron, extremely hard and ground to fit into position. Shaft is made of turned steel, oversize, and mounted on oversized bearings. The shaft installed in pump possesses the same high qualities of design and construction as the shafts installed in the larger pump.

Bushing bearing next to impeller is rubber lined. By having this bushing rubber-lined, and feeding fresh water to it, the grit is prevented from entering the bushing, therefore assuring long service from this particular style of bushing design.

Outboard bearing is of the ring oiling type. Rings on this bearing also continuously lubricate the ball thrust bearing.

The principal wear is concentrated on the hard wear nozzle and the impeller; the wear taking place at the running joint formed between these 2 parts. When a considerable clearance is worn at this joint, a reduction in the capacity of the pump will become noticeable.

To compensate for this wear, and to bring the pump back to its normal operating capacity loosen lock nut and slightly tighten nut, which wear take-up adjustment closes up the worn clearance between the impeller hub and the wear nozzle. This adjustment moves the impeller hub toward the face of the wear nozzle, again forming a perfect running joint. This wear adjustment can be made many times.

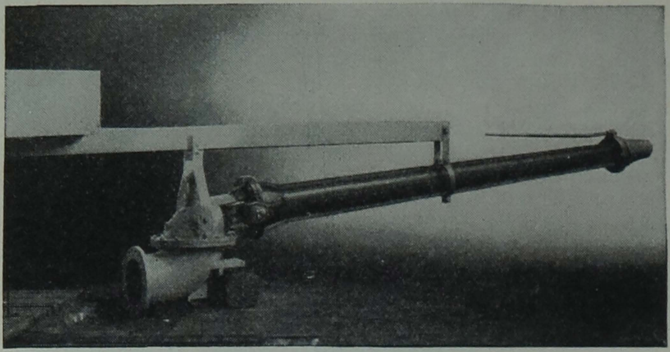
Size Pump In.	Belted Type Each	Direct-Connected Each	Normal Capacity Cu. Ft. per Min.	*Capacity Tons per Hr.	Approx. H.P. for Each 10-Ft. Head	Speed, R.P.M. Head, Feet 10	15	20	25	30	35	40	45	50	Approx. Weight Lbs.
**1¼	$240.00	$280.00	6	12	.50	825	975	1120	1140	1250	1325	1375	1465	1525	230
**1½	250.00	300.00	8	15	.65	825	975	1120	1140	1250	1325	1375	1465	1525	250
†2	300.00	340.00	13.5	29	1.10	910	1070	1200	1280	1375	1470	1530	1612	1720	260

**1¼ and 1½-inch have threaded connections.

†2-inch has flanged connections.

Hendy Hydraulic Giants

For Hydraulic Mining, Stripping and Earth Moving Operations



Pressure water entering the giant exerts a strong upward pressure which tends to lift the ball section off the entrance elbow. The king-bolt gives ample security against this hydraulic force and insures safety. The ball bearing reduces frictional loads created by this same force and permits easy rotation of the giant spout.

Giants are furnished with slip joint or flanged inlet as desired. Inlet flanges for standard giants are drilled to A.S.M.E. standard for 125 pounds. Inlet flanges for high pressure giants are drilled to A.S.M.E. extra heavy standard. Approximate vertical deflection 55 degrees above and 11 degrees below horizontal. Rotation, 360 degrees.

Two standard nozzles are furnished with each giant. Special size nozzles furnished as desired. Wood balance bar and box are not furnished.

Standard giants are furnished in 9 sizes, designed for medium pressures. Nos. 1 and 2 for pressure heads not over 300 feet; Nos. 3 to 9 for pressure heads not over 200 feet.

High pressure giants are furnished in 9 sizes designed for high pressures. Unless otherwise specified, these giants are built for a maximum pressure of 600 feet. Furnished for any pressure head desired on special order.

Specifications

Size No.	Inlet Diam. In.	Butt Diam. In.	Std. Nozzle In.	Wt. Std. Giant Lbs.	Wt. High Press. Giant Lbs.	Size No.	Inlet Diam. In.	Butt Diam. In.	Std. Nozzle In.	Wt. Std. Giant Lbs.	Wt. High Press. Giant Lbs.
1	7	4	2–3	390	550	**6**	15	9	6–7	1850	2250
2	9	5	3–4	520	730	**7**	15	10	6–7	2100	2560
3	11	6	3–4	890	1265	**8**	18	10	7–8	2300	2950
4	11	7	4–6	1075	1450	**9**	18	11	9–10	2450	3300
5	13	8	5–6	1475	2050	..	..	..	....	....	....

Flow of Water through Giant Nozzles

Size Nozzle Inches	Effective Head, Feet 100	200	300	400	500	600
2	94	133	163	188	210	232
3	222	300	368	425	475	522
4	380	535	655	756	845	926
5	590	835	1020	1180	1320	1445
6	850	1200	1470	1700	1900	2080
7	1160	1635	2000	2320	2590	2835
8	1510	2140	2620	3020	3380	3700
9	1920	2700	3320	3820	4270	4680
10	2360	3340	4090	4720	5280	5780

Water quantities are given in cubic feet per minute and are based on 90 per cent of the theoretical flow.

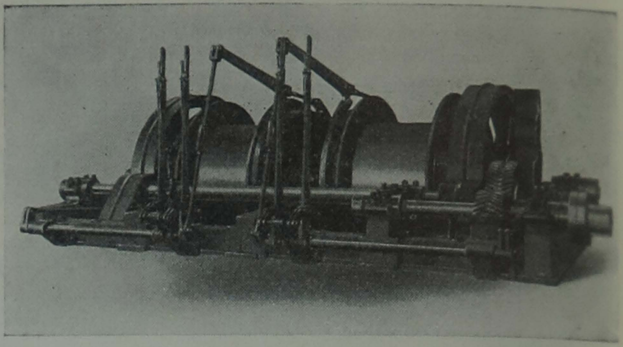
Duty of Hydraulic Giants

The following table is based on a duty of 3 cubic yards of gravel for each Miner's Inch of water and gives approximate quantities of gravel in cubic yards washed and transported in 24 hours.

Size Nozzle Inches	Effective Head, Feet 100	200	300	400	500	600
2	188	266	326	376	420	464
3	444	600	736	850	950	1044
4	760	1070	1310	1512	1690	1852
5	1180	1670	2040	2360	2640	2890
6	1700	2400	2940	3400	3800	4160
7	2320	3270	4000	4640	5180	5670
8	3020	4280	5240	6040	6760	7400
9	3840	5400	6640	7640	8540	9300
10	4720	6680	8180	9440	10560	11560

Prices upon application.

Vulcan Cast Iron Frame Electric Hoists



No. 60, Double Drum Hoist with Post Brakes and Band Clutch on Each Drum

All hoists of this series are of the double reduction type and are provided with flexible coupling connection to the motor. Instead of overhanging the high speed pinion on the motor shaft, as is usually done in double reduction geared hoists, the pinion is rigidly mounted on an independent shaft between extra large bearings, thus assuring correct and permanent alignment. Since the motor bearings carry but little load, motor troubles due to bearing wear are minimized. Herringbone gears in enclosed gear cases are standard for the primary reduction. This results in unusual quietness and high efficiency.

Band or post brakes can be furnished on this series.

The cast iron frames are of heavy inverted U section, with the metal distributed to give maximum stiffness, and are sectionalized to facilitate handling.

Dual main gears carry and drive clutches, thus relieving drum shaft and keys from torsional stresses.

The drums are not merely cast approximately true, but they are machined over all absolutely true. These consist of three pieces, a drum shell and two drum ends, all rigidly interconnected on machine finished joints in such a manner that all axial stresses on the flanges are carried by steel members.

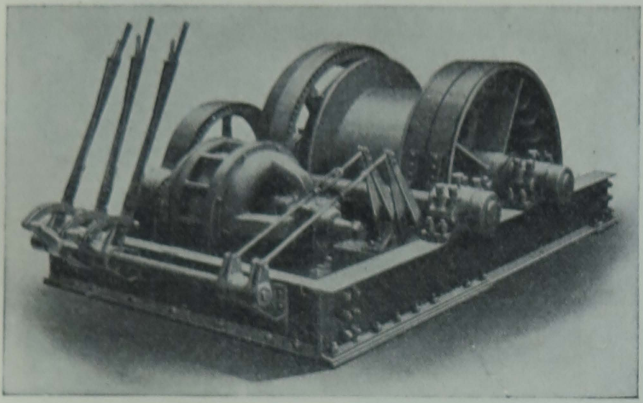
In the design of band brakes, particular attention has been given to securing a powerful brake which can be applied with but little effort. To this end a patented, double linkage of brake levers is applied which permits holding the load with but 25 pounds on the brake operating lever. Since over 90% of the periphery of the brake ring is in contact with the brake band, an unusually large wearing surface is afforded. The design of the brake ring is such as to provide ample radiation. Brake bands and brake posts are provided with removable asbestos brake lining so attached as to be a simple field replacement. Asbestos or wood blocks are optional on post brakes. Post brakes are standard on double drum hoists and in the large sizes these are of the parallel acting type.

In the band clutch design the driving torque is transmitted from the gear directly to the drum. These clutches are faced with asbestos clutch lining. The clutch ends and linkage are of special design, generously proportioned, and made of fatigue resisting alloy steel.

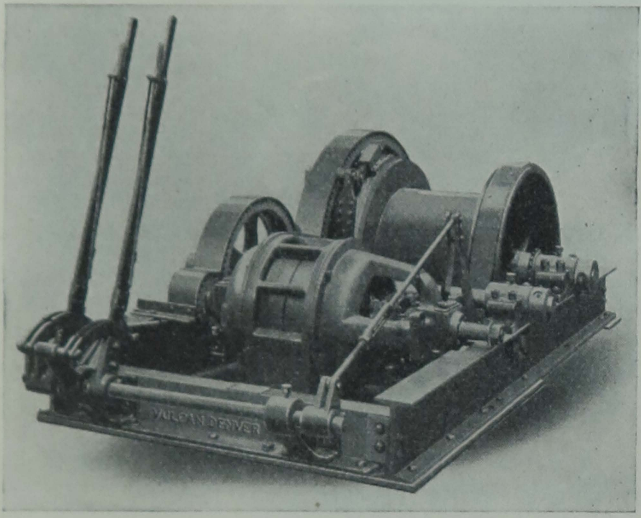
Hoist No.	**60–III**	**80–III**	**100–III**	**150–III**
Rope Pull............lbs.	6000	8000	10000	15000
Motor Horse Power......	60, 80	80, 100	125, 150	200, 250
Rope Speed........f.p.m.	280, 365	280, 355	350, 435	375, 470
Drum Diameter........in.	36	42	48	60
Drum Face............in.	24	30	36	48
Flange Depth..........in.	8	8	10	10
Rope Capacity.........ft.	3000	3100	4100	5100
Rope Size.............in.	¾	⅞	1	1⅛
Single Drum				
Length Over All..........	8′7″	10′7″	12′10″	14′10″
Width Over All...........	8′4″	8′6″	8′10″	10′0″
Weight...............lbs.	10500	15000	24000	36000
Double Drum				
Length Over All..........	13′3″	14′6″	16′6″	20′6″
Width Over All..........	8′4″	8′6″	8′10″	10′0″
Weight...............lbs.	17500	22000	37000	52000

Prices upon application.

Vulcan Steel Frame Single Drum Electric Hoists



No. 24½, with Double Band Brakes and Clutch (Special Sectionalized and Bolted Construction)



No. 22, with Double Band Brakes and Clutch (Special Sectionalized and Bolted Construction)

Steel frame construction is used in this series of hoists. Extra heavy machined steel members, box framing and low bearing centers, all contribute to make this an unusually rigid design. Since the frame is unbreakable and lighter in weight than a cast iron frame of the same strength, this construction has become especially popular in underground service where the hoist must be occasionally moved. Having the motor inside the frame affords great compactness.

Vulcan patented double multiplying band brakes are standard and these hoists can be furnished with either single or double brakes as well as with or without clutch.

The bearings are removable and are fitted to the frame on machined surfaces.

The drums are not merely cast approximately true, but they are machined true over all. These consist of three pieces, a drum shell and two drum ends, all rigidly interconnected on machine finished joints in such a manner that all axial stresses on the flanges are carried by steel members.

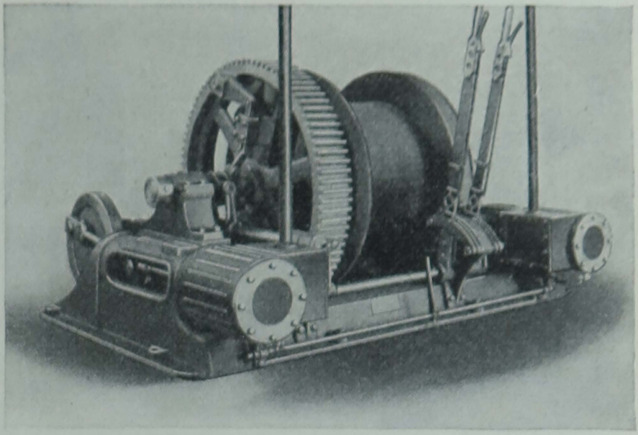
Hoist No.	**21½**	**22**	**23**	**24**	**24½**
Rope Pull....lbs.	2750	3500	4500	5500	7000
Motor H.P.	20, 30	30, 40	40, 50	50, 60	60, 80
Rope Speed f.p.m.	200, 305	240, 320	250, 310	250, 300	240, 320
Drum Diam...in.	21	24	28	32	36
Drum Face....in.	15	18	21	22	24
Flange Depth..in.	8½	10	9	10	8
Rope Capacity.ft.	1850	3000	3400	3300	3000
Rope Size.....in.	⅝	⅝	⅝	¾	¾
Length Over All..	6′2″	7′11″	8′0″	8′10″	9′6″
Width Over All..	4′2″	4′6″	5′4″	5′8″	6′1″
Weight.......lbs.	3000	4850	6500	8500	11000

Rope capacities above are 80 per cent of amounts drums will hold when filled with rope. Weights given do not include motor. Frames are built in one piece unless otherwise specified.

Prices upon application.

Vulcan Steam Hoists

Tangye Frame—Geared Type

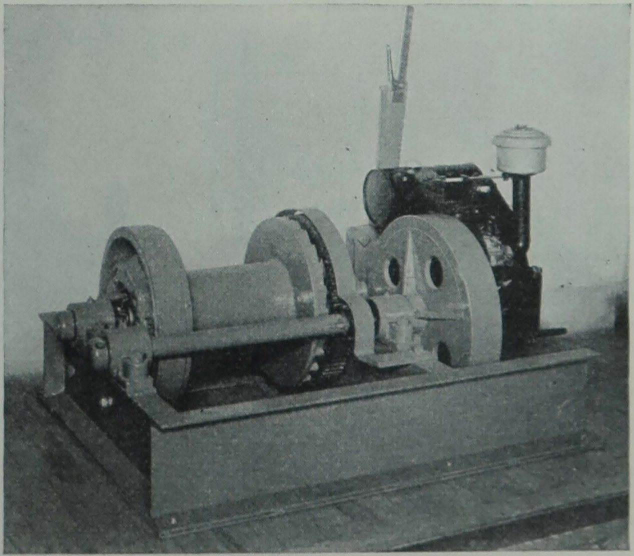


The demand for steam hoists continues in many localities because low fuel costs or comparatively high rates for electricity make these the logical choice. The small sizes are adapted for use with compressed air in underground service.

Hoist No	**56**	**68**	**710**	**810**	**910**	**1010**
Bore and Stroke......in.	5x6	6x8	7x10	8x10	9x10	10x10
H. P	12	28	38	45	55	68
Rope Pull...........lbs.	1800	2600	3600	4000	5000	6000
Rope Speed.......f.p.m.	225	350	350	375	375	375
Drum Diameter......in.	18	24	30	30	36	36
Drum Face...........in.	8	18	15	20	17	22
Rope Capacity........ft.	1000	2100	1800	2300	2800	3000
Rope Size............in.	½	⅝	¾	¾	¾	⅞
Wt., Sgl. Drum......lbs.	2500	4700	5500	7400	9300	9500
Wt., Dbl. Drum.....lbs.	3500	6600	8200	10400	13000	13300

H.P. rating based on 100 pounds per square inch steam pressure. Reversing links if desired.

No. 10-PC Vulcan Prospector's Hoists



This compact hoist is equipped with a 4 h.p. air cooled engine. It is an efficient and readily portable unit especially designed for prospecting work. The drum is provided with a plate type asbestos lined clutch and asbestos lined band brake interlocked so that one lever only is required to operate the hoist. A safety ratchet is also provided. Also available with 5 h.p. electric motor and 150 f.p.m. rope speed.

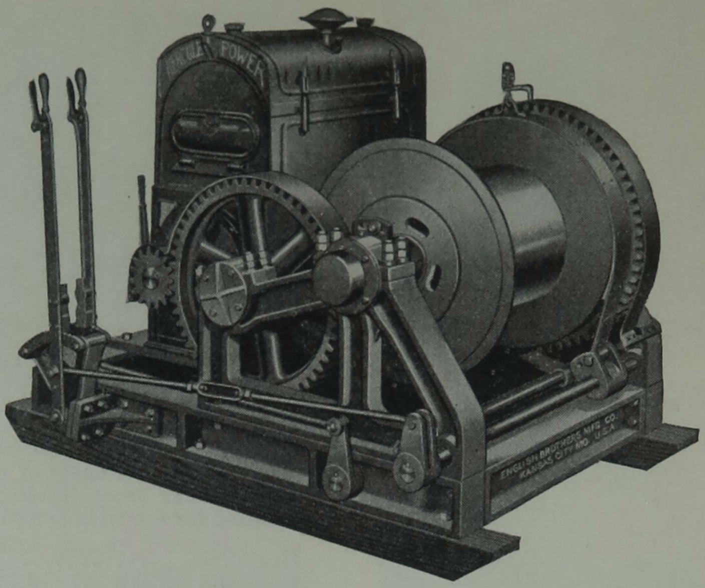
Rope pull, 700 pounds. Rope speed, 80 f.p.m. Holds 450 feet of ⅜-inch rope in 6 layers. Diameter drum, 7½ inches. Drum face, 12 inches.

Weight with engine, 950 pounds.

No. 10-PC, with Engine....................each **$395.00**

Type MTC Samson Friction Drum Mine Hoists

Gasoline Powered



The power unit of this Type MTC hoist is a 4-cylinder high grade machine, tested and fully guaranteed. It develops its rated power at 1200 r.p.m.

Speed is controlled by governor, which may be adjusted to maintain any speed from 750 to 1600 r.p.m.

Enclosed disc clutch on power take-off shaft is furnished for starting motor without revolving hoist gears.

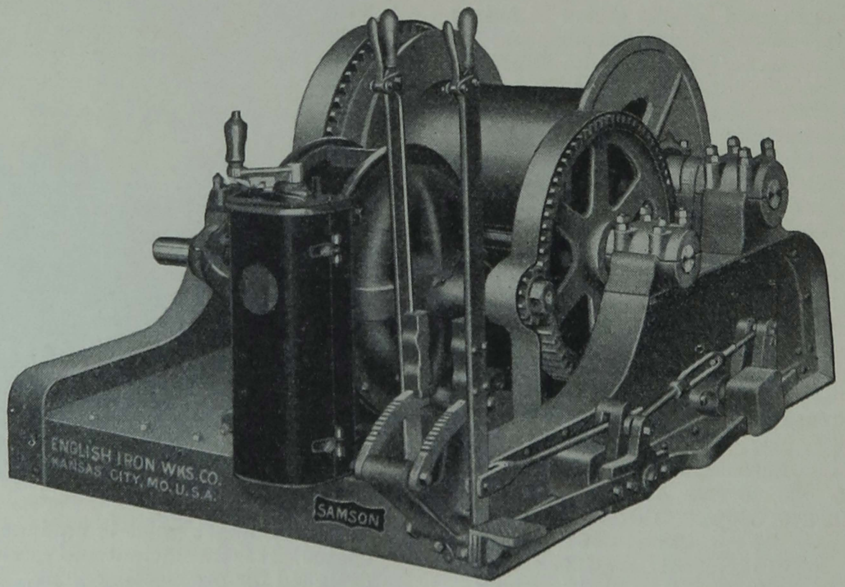
Foot brake is furnished as part of standard equipment.

Specifications

No.	**443**	**444**	**445**
Engine	30	40	50
Hoisting Duty, Max. Wt. lbs.	2500	3000	3000
Rope Speed Hoisting Duty f.p.m.	265	290	365
Diameter Drums in.	24	24	24
Length Bet. Drum Flanges in.	24	24	30
Bedplate in.	55x75	55x75	62x75
Approx. Shipping Weight lbs.	4200	4800	5000

Type MS Samson Friction Drum Mine Hoists

Varying Speed Electric Motor



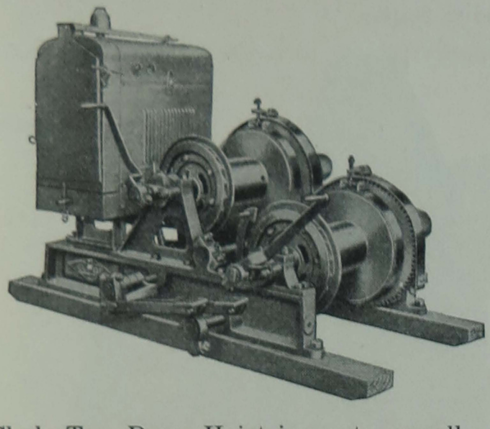
The frame of the Type MS hoist is fabricated steel, strongly riveted and rigidly braced, so that it is absolutely stiff and practically indestructible. There is no possibility of the frame fracturing under unusual shocks.

Due to the frame being made of fabricated steel, it is much lighter than cast iron hoist. Hence, the expense of handling and transportation is less.

Specifications

No.	**900**	**905**	**910**
Motor h.p.	50	60	80
Hoisting Duty, Weight lbs.	6000	5000	4000
Hoisting Duty, Rope Speed f.p.m.	225	325	500
Diameter Drums in.	18	24	30
Length Bet. Drum Flanges in.	24	24	24
Bedplate in.	60x90	60x90	60x90
Approx. Shipping Weight lbs.	6500	7700	8500

Clyde Two Drum Gasoline Hoists



The Clyde Two Drum Hoist is most generally used for handling a derrick, pile driving, steel erection and for all types of general construction work.

Drums are cast in one solid unit of semi-steel, well balanced for level winding, bronze bushed, and equipped with a removable ratchet ring. The brake surface, smoothly machined, is located on the opposite end of the drum from the friction. A brake, of the band type, asbestos lined is provided for each drum. Adjustment is conveniently accomplished as the adjusting bolt is on top. Brakes are operated by foot levers; release automatically when pressure is removed from the foot lever. Pawls, forged from solid stock of hot rolled steel, are provided for each drum.

The gasoline motor is equipped with high tension magneto, force feed lubricator, fuel tank, radiator and fan, air cleaner, muffler, carburetor and all accessories. Engines 30 h.p. and larger are equipped with a multiple disc free engine clutch. The clutch lever is mounted on the operator's side of the hoist.

A winch head is fitted on the drum shaft extensions on the left hand side of the hoist. The winch head is a one piece semi-steel casting having a smoothly machined surface for use with manila rope.

Independent jaw clutch winch heads may be furnished when specially ordered with the hoist. Clutch winch heads are not interchangeable with standard winch heads.

A boom swinging attachment is recommended when the hoist is used for derrick service.

This hoist may be converted into a 3-drum unit by the addition of a third drum extension.

Hoists with special line pulls and speeds can be furnished.

Furnished with gasoline engine including accessories, speed control, chain drive, winch heads and other features.

Fixtures and tools necessary for operation are shipped with each hoist and packed in a tool box fitted with padlock.

Hoist is mounted on timber skids for shipment.

No.	Hoisting Duty Single Line Pull, Lbs.	Hoisting Duty Feet per Minute	Motor Bore and Stroke	Motor H.P.	Motor Cy.	Frame Size	Drums Diam. In.	Drums Lgth. In.	Drums Flange Diam. In.	Approx. Ship. Wt. Lbs.
*7211	1500	160	2¾x3½	12	4	C	8	15	18	2300
*7212	2500	150	3⅛x4½	15	4	C	8	15	18	2600
*7213	3000	150	3⅜x4½	20	4	C	8	15	18	2700
**6835	3500	200	3¾x4¾	30	4	D	10	16	22	3900
**7231	3500	175	3¾x4½	25	4	E	12	20	22	5400
**7232	4000	175	4 x4½	30	4	E	12	20	22	5400
**7233	4500	175	4 x5	35	4	E	12	20	22	5800
**7234	5000	175	4¼x5	40	4	E	12	20	22	5900
6837	4000	250	4¼x6	45	4	F	12	24	22	6800
6838	5000	200	4¼x6	45	4	F	12	24	22	6800
6839	5000	250	4¾x6	55	4	F	12	24	22	7100
6840	6000	200	4¾x6	55	4	G	14	26	26	8900
6841	6500	250	5 x7	70	4	G	14	26	26	9100
6842	7500	200	5 x7	70	4	G	14	26	26	9200
6843	7500	250	5½x7	80	4	G	14	26	26	9400
6844	9000	200	5½x7	80	4	H	16	28	29	10800
6845	9000	250	6½x7	100	4	H	16	28	29	11100
6846	12000	200	6½x7	100	4	J	18	30	33	14400
6874	10000	250	6¾x7	120	4	J	18	30	33	14800
6848	13000	200	6¾x7	120	4	J	18	30	33	14800

*Semi-steel gears; semi-steel bed.

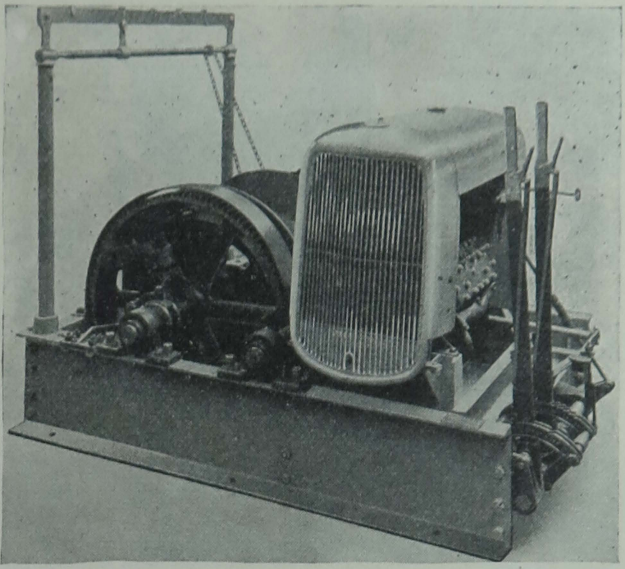
**Semi-steel gears; steel bed.

All other numbers have steel gears and steel bed.

Prices upon Application

No. 21½ Vulcan Gasoline Hoists

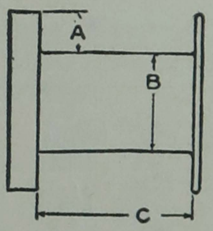
With Friction Clutch and Ford V-8 Power Unit



For service involving a rope pull of from 2750 to 3000 pounds with Ford V-8 power units; also for handling buckets in shaft sinking and development work or for unwatering. Can be furnished with or without a friction clutch for the drum. For shallow shafts, where a free spooling drum and increased lowering speed is not important, the drum friction clutch is often omitted. Drum has 21-inch diameter by 18-inch face. Capacity, 4 layers; 1150 feet of ½-inch or 950 feet of ⅝-inch rope. Steel frame of bolted and sectionalized construction. Heavy self-aligning ball bearings. Brakes are post type, steel, and asbestos lined. Contracting ban clutch is optional. Rope speed, 200 to 300 f.p.m.

Weight with Ford V-8 power unit, 3800 pounds.

How to Estimate Cable Capacity of Hoist Drums



The following rule will be found applicable in determining the cable capacity of any size drum.

Rule: Add the diameter of the drum, B, to the depth of the flange, A.

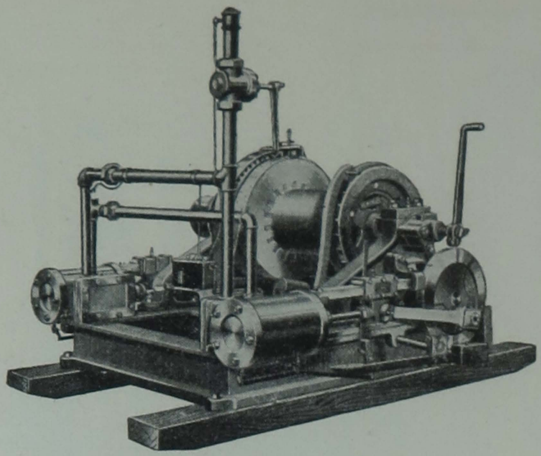
Multiply this sum by the depth of the flange A,and multiply the result by the length between flanges C; all in inches. Multiply the product by the figures in the right-hand column opposite the size cable wanted, in the table below.

Size Cable Inches	Multiply by	Size Cable Inches	Multiply by
¼	4.16	1⅜	.138
⅜	1.86	1½	.116
7/16	1.37	1⅝	.099
½	1.05	1¾	.085
9/16	.828	1⅞	.074
⅝	.672	2	.066
¾	.465	2⅛	.058
⅞	.342	2¼	.052
1	.262	2⅜	.046
1⅛	.207	2½	.042
1¼	.167	...	....

Example: (B plus A)×A×C×figure opposite size of required cable=number of feet of the specified size cable that drum will hold.

Clyde Hoisting Engines

Double Cylinder—With and Without Boiler



One-Drum—Without Boiler

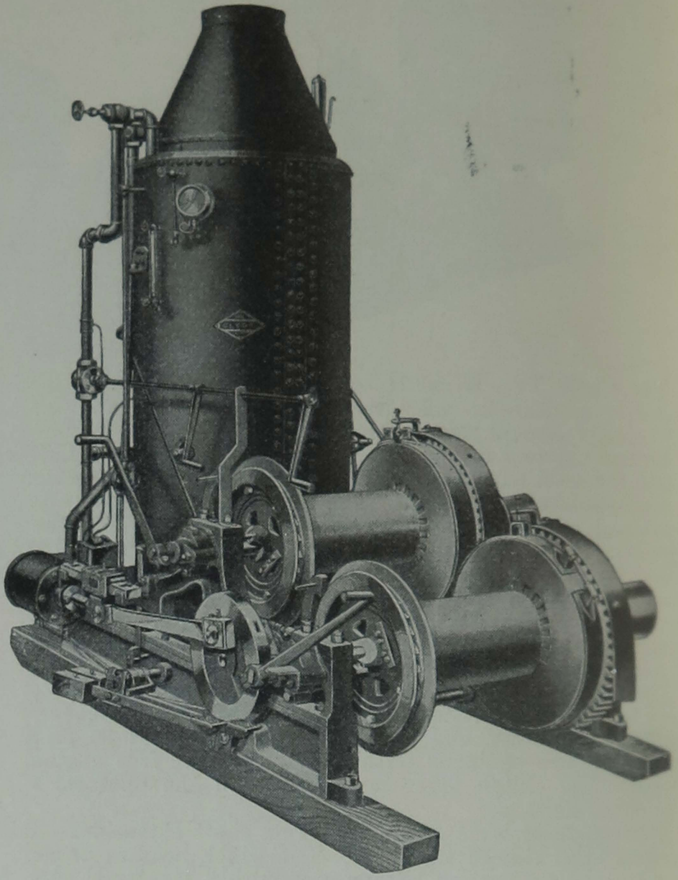
One-Drum Hoisting Engine

For general hoisting and pile driving where only one drum is required. The hoists without boilers are used where either steam or compressed air is available. Occupy less floor space than the hoists with boilers and are therefore adapted for use on docks and steamers.

2-Drum Hoisting Engine

Used for general contracting work, pile driving and derrick work, where 2 independent drums are required. Also used for clam-shell and orange-peel bucket work in conjunction with a bucket holding drum.

The hoist without boiler is considerably lighter and more compact, and requires less floor space than the hoist with boiler, making it desirable where floor space is limited and air or steam is available, and therefore well adapted for use on scows and docks.



2-Drum—With Boiler

Semi-Steel Gears, Cut Teeth

One-Drum			2-Drum					Drums				Boiler		
Cat. No. With Boiler	Cat. No. Without Boiler	Approx. Ship. Wt. Lbs.	Cat. No. With Boiler	Cat. No. Without Boiler	Approx. Ship. Wt. Lbs.	Size Cylinders, Bore and Stroke In.	H.P.	Diam. In.	Lgth. In.	Flange Diam. In.	Capacity on Single Line at Normal Speed Lbs.	Diam. In.	Lgth. In.	No. of 2-Inch Flues
13	..	4300	**101**	...	5400	4¾x 6	12	8	18	22½	3000	30	72	52
..	**66**	2500	...	**205**	3500	4¾x 6	12	8	14½	22½	3000	..	..	..
14	..	6100	**102**	...	7700	5½x 8	16	12	22	26	4000	36	72	76
..	**68**	3500	...	**207**	5600	5½x 8	16	12	17	26	4000	..	..	..
15	..	6300	**103**	...	7900	6¼x 8	20	14	22	26	4500	36	72	76
..	**70**	3700	...	**209**	5700	6¼x 8	20	14	17	26	4500	..	..	..
16	..	7700	**104**	...	10700	6¼x10	25	14	27	26	5500	42	90	96
..	**72**	4700	...	**212**	6600	6¼x10	25	14	22	26	5500	..	..	..
17	..	8300	**105**	...	11800	7 x10	30	14	27	26	7000	42	90	96
..	**74**	4900	...	**214**	7000	7 x10	30	14	22	26	7000	..	..	..

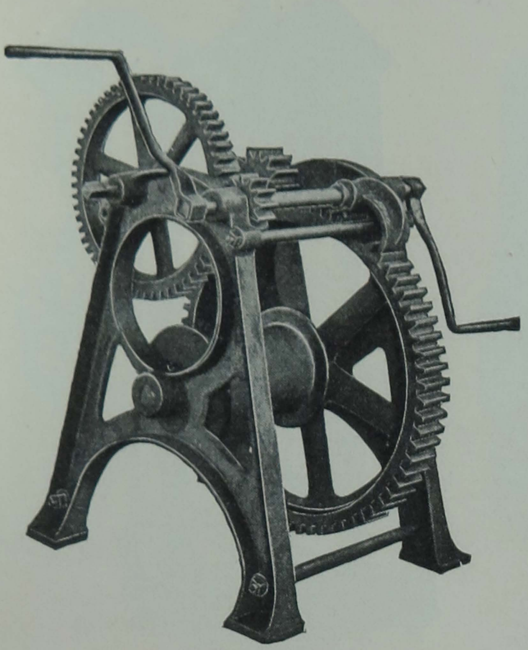
Steel Gears, Cut Teeth

One-Drum			2-Drum					Drums				Boiler		
23	..	8300	**106**	...	11800	7 x10	30	14	27	26	7000	42	90	96
..	**81**	4900	...	**216**	7100	7 x10	30	14	22	26	7000	..	...	..
24	..	10500	**107**	...	14000	8¼x10	40	14	28	29¾	9000	42	102	96
25	..	12200	**108**	...	16000	8¼x10	40	14	39	29¾	9000	48	102	128
..	**83**	5800	...	**218**	8800	8¼x10	40	14	23	29¾	9000	..	...	...
26	..	11000	**109**	...	14500	9 x10	50	14	28	29¾	10000	42	114	96
27	..	12000	**110**	...	16400	9 x10	50	14	39	29¾	10000	48	114	128
..	**85**	6700	...	**220**	9200	9 x10	50	14	23	29¾	10000	..	...	...
28	..	16000	**111**	...	19700	10 x10	60	18	39	33 13/16	11000	54	102	180
..	**86**	8000	...	**221**	11500	10 x10	60	18	30	33 13/16	11000	..	...	...
29	..	17500	**112**	...	22000	10 x12	70	18	39	33 13/16	13000	54	108	180
..	**87**	9500	...	**222**	13000	10 x12	70	18	30	33 13/16	13000	..	...	...
30	..	24000	**113**	...	28500	11 x13	85	18	38	39⅝	16000	60	120	216
..	**88**	13000	...	**223**	17500	11 x13	85	18	29	39⅝	16000	..	...	...
31	..	28000	**114**	...	34000	12 x14	100	18	37	45	20000	66	120	308
..	**89**	16000	...	**224**	22000	12 x14	100	18	28	45	20000	..	...	...

Prices upon Application

Hand Winches

Double Purchase All-Iron Hand Winches

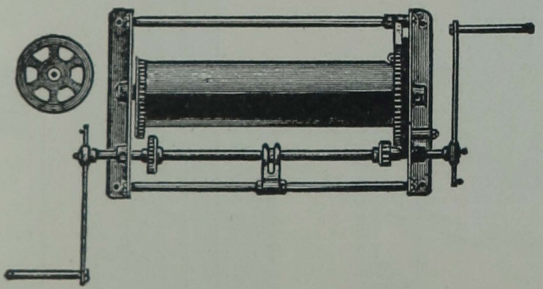


This hand winch is self-contained, simple and powerful, and is capable of standing all the strain which can be applied to it by hand. The intermediate shaft is squared at the ends to receive the handles for taking up and paying out slack. A heavy pawl is fitted to the main gear to hold the load at any point. The drum is straight for wire rope and curved for Manila rope. Two handles are supplied with each machine.

Friction band brake furnished, when desired, at additional price.

Size No.	Ratio of Gearing	Diam. of Drum Inches	Load Hoisted Lbs.	Ship. Wt. Lbs.	Price Each
1	36 to 1	12	10000	1100	**$100.00**
2	28 to 1	9	5000	600	**55.00**

All-Iron Prospectors' Winches



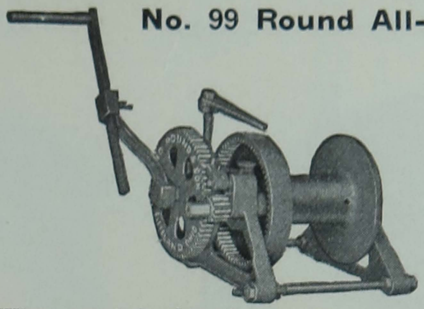
This is a special all-iron hand windlass for prospecting, etc. Drum is 30x8 inches. Made with two handles, adjustable from 6 to 17 inches in length, and double gearing, either 2 to 1 or 5 to 1. Gearing may be changed instantly. Equipped with safety catch for holding load at any point and with brake band for lowering.

May be used directly over shaft or with tripod.

Weight, 200 pounds.

Each.. **$42.50**

No. 99 Round All-Steel Winches



Adapted to hundreds of lifting and pulling jobs over a wide range of service. Can be readily moved, bolted anywhere, and will operate in any position.

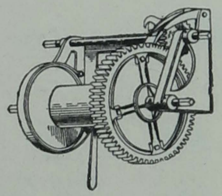
Has 2 speeds. When crank is placed over the square end of pinion shaft, a gear ratio of 24 to 1 is developed for handling loads up to 5 tons. For rapid work, crank is placed over square boss in center of large external gear, obtaining a gear ratio of 4 to 1 for loads up to 1500 pounds. Crank is adjustable from 11 inches to 24 inches permitting change of leverage to suit job. Spring-operated steel dog and self-locking internal brake insures safety in handling any load up to 5 tons.

No. **99**.......................................each **$75.00**

Specifications

Diameter and length of drum, 4½x8½ inches. Height of flange, 3¾ inches. Capacity direct from drum: Rapid lift 1500 pounds; compound gear 10,000 pounds. Wire rope capacity: 165 feet ⅝-inch, 285 feet ½-inch, 450 feet ⅜-inch. Dimensions over all without handles: Width 18 inches, length 16 inches, height 13 inches. Distance center to center of holes for mounting: Width 13½ inches, length 12 inches, holes ⅝ inch. Net weight, 135 pounds.

No. 110 Sasgen Single Drum Single Purchase Winches

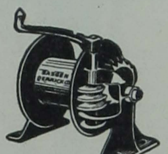


This winch is furnished with bushings. It will lift 1 ton, with one man and 2 lines, 2 tons with 2 men and 4 lines. Diameter of drum 4 inches, length, 8 inches; diameter of gear and pinion 12x3 inches. Weight 71 pounds.

No. **110** ....each **$23.10**

Sasgen Safety Worm Gear Winches

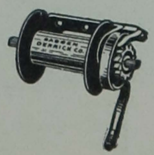
Made of best malleable iron.



No.	Diam. and Lgth. Drum Inches	Worm Gear Ratio	Lift, Pounds 1 Man 1 Line	Lift, Pounds 1 Man 2 Lines	Wt. Lbs.	Price Each
0	5½x 6	16–1	350	700	36	**$17.60**
1	5½x 6	20–1	750	1500	57	**19.80**
2	8 x10	30–1	1000	2000	90	**24.20**

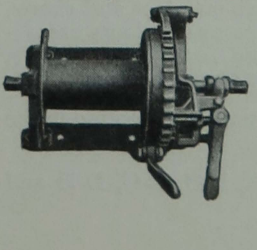
Sasgen Small Winches

Not Geared



No.	Diam. and Lgth., Drum Inches	Lift, Pounds 2 Men 1 Line	Lift, Pounds 2 Men 2 Lines	Wt. Lbs.	Price Each
3	3½x7	750	1500	35	**$11.00**

Sasgen Single Shaft Geared Winches



No.	Diam. and Lgth., Drum Inches	Diam. Gear and Pinion Inches
115	4x8	10x3

No.	Lift, Tons 1 Man 2 Lines	Lift, Tons 2 Men 4 Lines	Wt. Lbs.	Each
115	¾	1½	71	**$30.80**

Standard Mine Cages

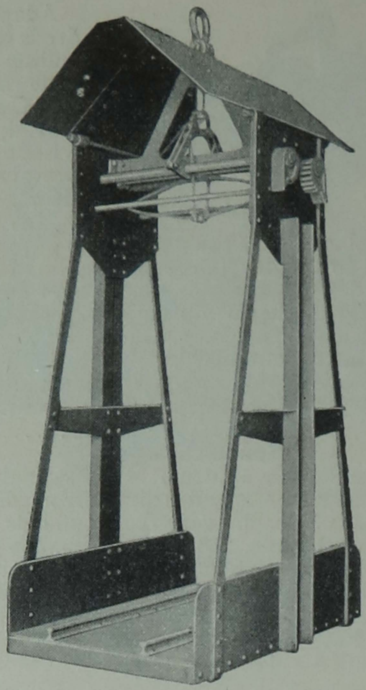
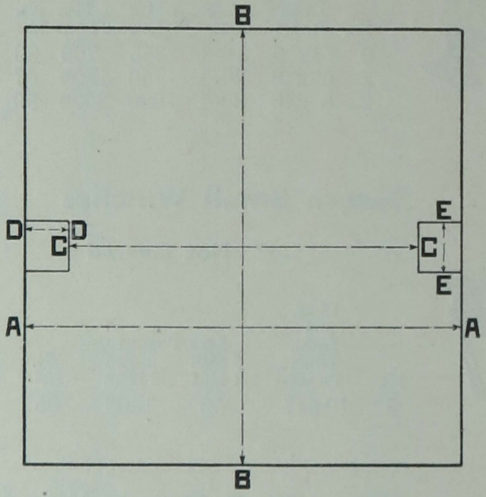


Illustration shows standard mine cage without automatic landing chairs or safety doors.

Standard mine cages are carefully designed and made of the best material and workmanship.

Style	Capacity Pounds Each Deck	Single Deck		Double Deck	
		Weight Pounds	Price Each	Weight Pounds	Price Each
2	2000	925	**$340.00**	1600	**$510.00**
2	3000	1150	**390.00**	1900	**585.00**
2	6000	1375	**440.00**	2300	**658.00**

Information Required for Ordering Cages and Chairs



When ordering or inquiring for prices on cages and chairs, specify the load to be carried, whether safety doors are desired, as required by the Colorado and Arizona state laws, also if cages are to be equipped with automatic chairs.

In addition to this advise the dimensions as indicated in the diagram.

For cages, give all dimensions; A-A, B-B, C-C, D-D and E-E. For chairs only; A-A and B-B.

Automatic Landing Chairs

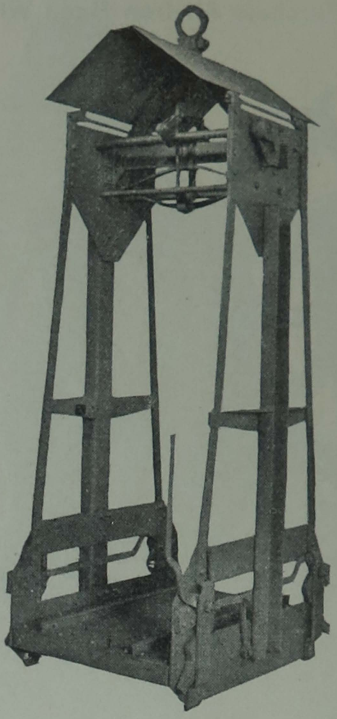


Illustration shows standard mine cage equipped with automatic landing chair.

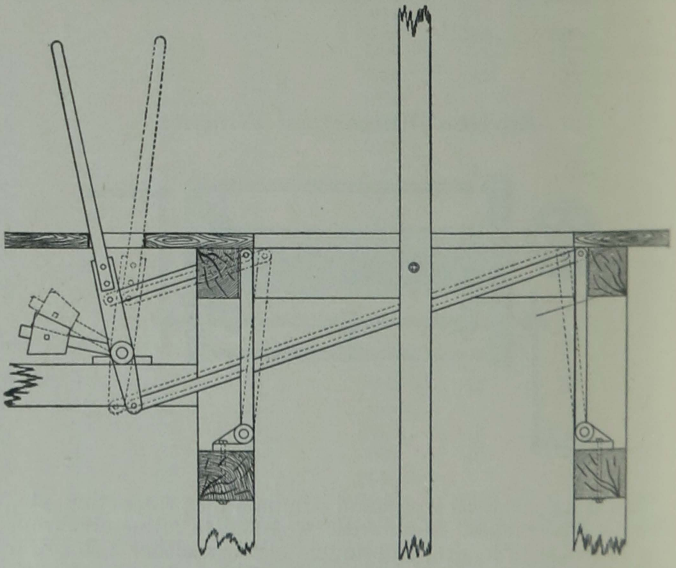
These landing chairs represent the latest and most perfect design in cage chairs. The illustration shows plainly their operation. The dogs bear on the top of the collar beams in the shaft so that no cutting is required. All the parts are of ample strength and made of solid steel forgings. The mechanism is extremely simple, nothing to get out of order or to be adjusted.

The chairs are set with the lever and automatically release when the cage is raised.

Weight of chairs approximately 200 pounds.

Prices and information furnished upon application.

Standard Landing Dogs or Chairs

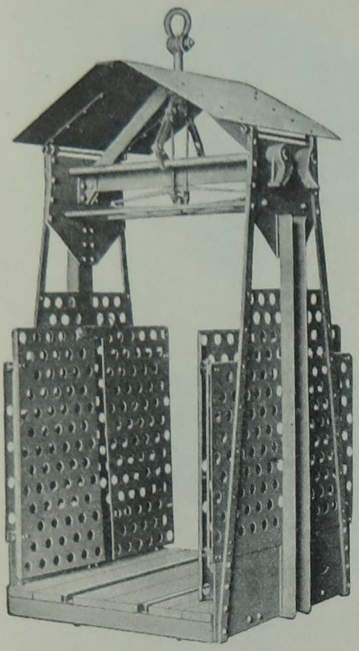


These chairs are made of Norway iron and steel. They are strong and durable. The weight may be adjusted to keep the chairs in, as shown, or it may be reversed so that it will hold them out unless thrown in by means of the hand lever.

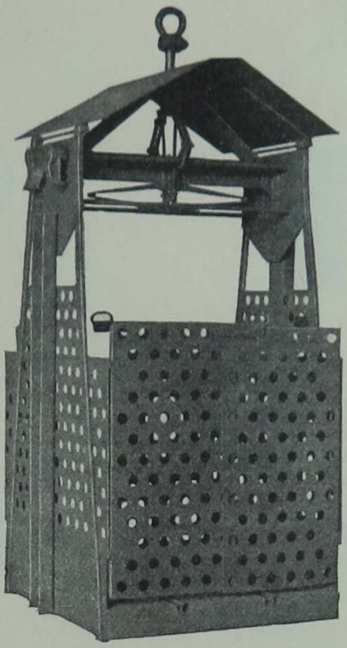
Price, Medium Weight, 450 Pounds.........per set **$80.00**
" Heavy " 550 " .... " **100.00**

Several other types of special chairs can be made; prices quoted upon application.

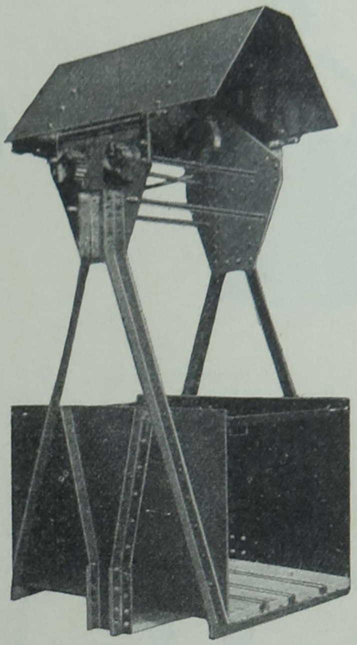
Mine Cages



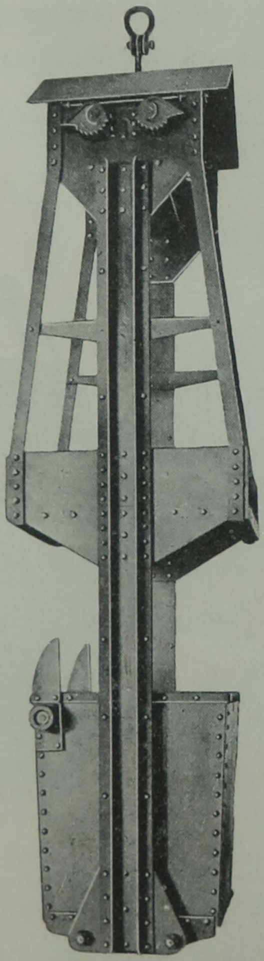
Single Deck Cage with Safety Doors Open



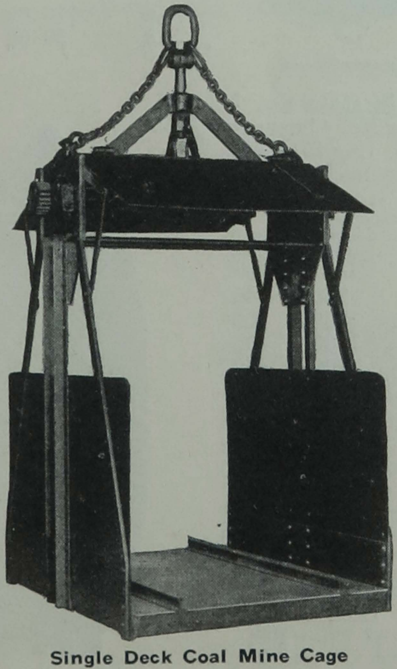
Single Deck Cage with Safety Doors Closed



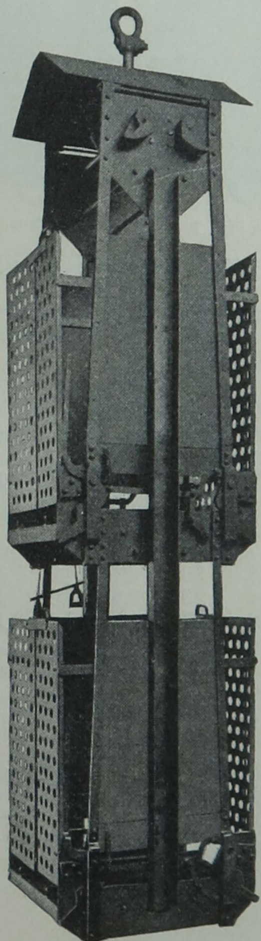
Special Single Deck Cage



Combined Cage and Skip



Single Deck Coal Mine Cage



Double Deck Cage

First class workmanship and only the best grades of steel and iron are used in the making of all these cages.

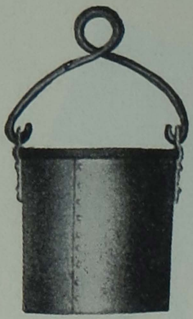
They are equipped with safety dogs and can be furnished in single or double deck, with or without automatic landing chairs and with safety doors to comply with the Colorado and Arizona state laws.

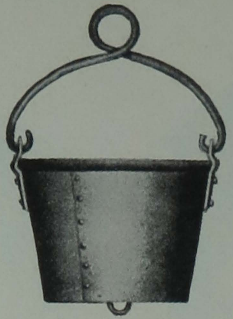
Cages are made up to order to purchaser's specifications.

When ordering or corresponding regarding mine cages, be sure to give all of the information and dimensions as indicated in diagram on preceding page.

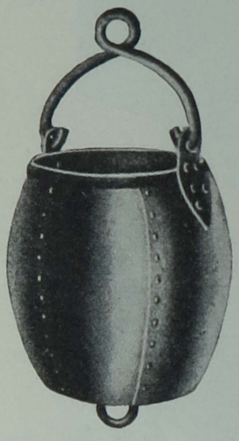
Prices and information will be sent upon receipt of specifications.

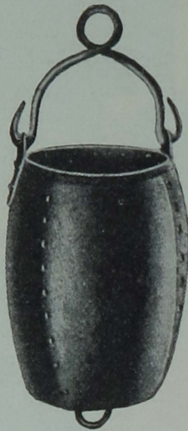
Ore Buckets

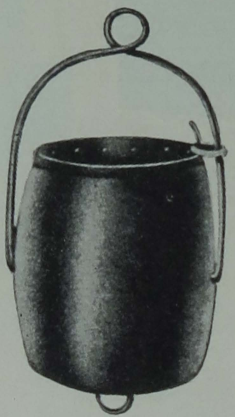

No. 8


Nos. 9 and 9½

No.	Ht. In.	Diameter Inches Top	Diameter Inches Bottom	No. of Steel	Cap. Cu. Ft.	Cap. Av. Ore Lbs.	Wt. Lbs.	With Band Price Each
8	16	16	14	16	1¾	200	33	.....
9	15	19	14	16	2	250	35	.....
9½	23	22	17	14	3	375	55	.....


Style No. 1


Style No. 2


Center Swing

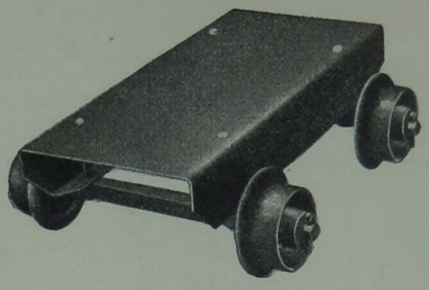
Unless otherwise ordered, bails are made in style No. 1 for Nos. 1, 2 and 3 buckets and in style No. 2 for No. 4 buckets and larger. The bottoms are dished so that the ring to which dumping chain is attached does not prevent bucket from standing upright.

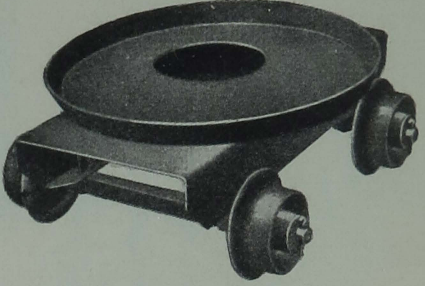
No.	Ht. In.	Diameter, Inches Top	Diameter, Inches Center	Diameter, Inches Bottom	No. of Steel	Capacity Cu. Ft.	Capacity Av. Ore Lbs.	Av. Weight Pounds
1	30	21	24	17	9	6½	750	140
2	30	21	24	17	11	6½	750	125
3	32	24	27	21	8	9	1100	195
4	37	28	34	23	¼	15	1700	400
5	37	24	28	22	¼	11	1300	350
6	24	20	22	16	14	4½	550	67
6½	28	20	24	16	14	6	725	75
7	19	17	19	14	16	2½	300	35
10	40	27	32	23	¼	15½	1800	400
11	48	26	31	22	¼	17½	2100	425
12	40	26	31	22	¼	14½	1650	375
13	42	26	31	22	¼	15	1700	385
14	28	22	28	19	3/16	7½	900	150

No.	Styles 1 and 2 Bail Price, Each Without Band	Styles 1 and 2 Bail Price, Each With Band	Styles 1 and 2 Bail Extra for Strips on Side	Center Swing Bail Price, Each Without Band	Center Swing Bail Price, Each With Band
1	......	......	......	......	......
2	......	......	......	......	......
3	......	......	......	......	......
4	......	......	......	......	......
5	......	......	......	......	......
6	......	......	......	......	......
6½	......	......	......	......	......
7	......	......	......	......	......
10	......	......	......	......	......
11	......	......	......	......	......
12	......	......	......	......	......
13	......	......	......	......	......
14	......	......	......	......	......

Other sizes and weights made to order. Prices upon application.

Ore Bucket Cars


Style No. 1

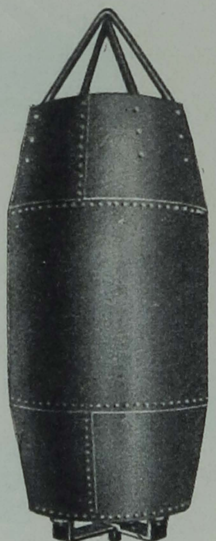

Style No. 2

These bucket cars are made of steel for 18 gauge track.

Style No. 1 can be furnished with wood bed at same price.

Diameter Wheels Inches	Price, Each Style No. 1	Price, Each Style No. 2	Diameter Wheels Inches	Price, Each Style No. 1	Price, Each Style No. 2
6	**$16.00**	**$20.00**	**10**	**$24.00**	**$28.00**
8	**20.00**	**24.00**	..	.....	.....

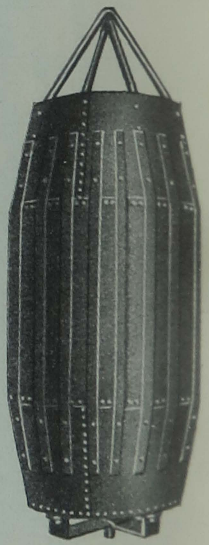
Water Buckets


Without Strips

These water buckets are made of the best steel, with wrought iron bail.

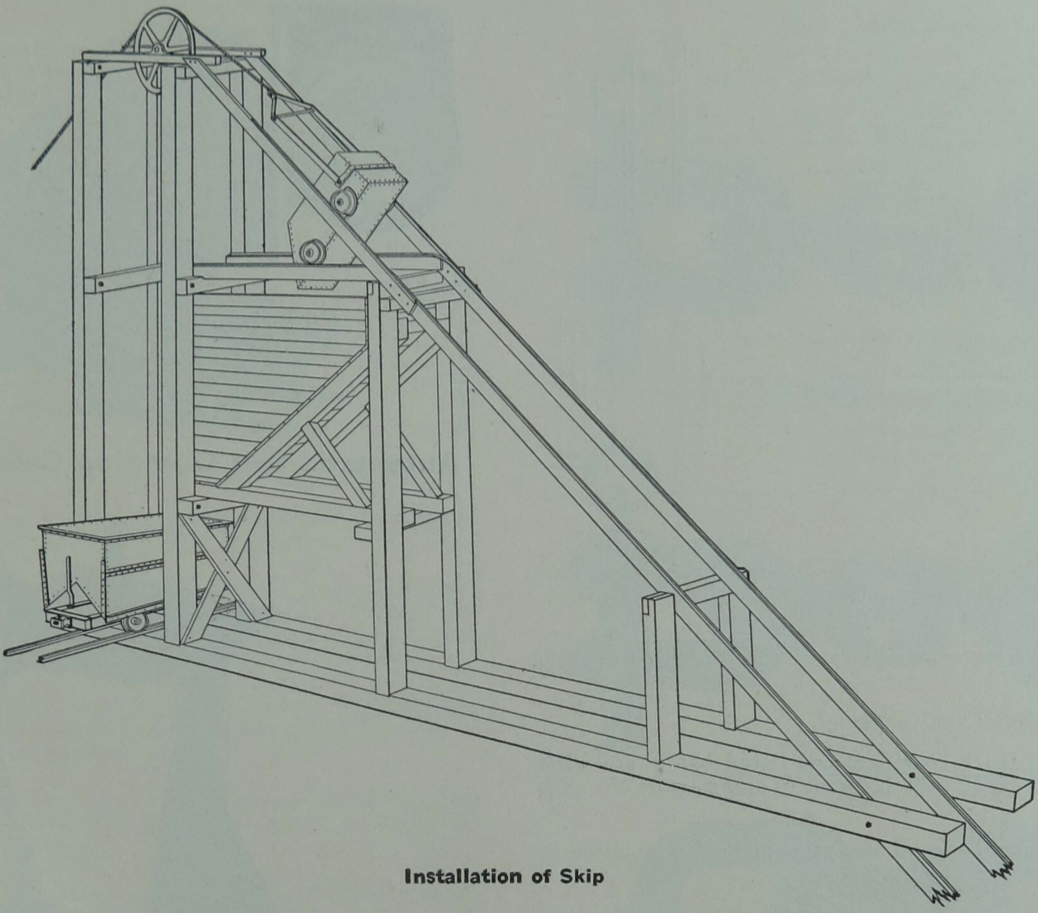
In the bottom is an automatic valve which is tight, durable and never out of order.

Buckets are smooth on the outside and will not catch in the shaft.


With Strips

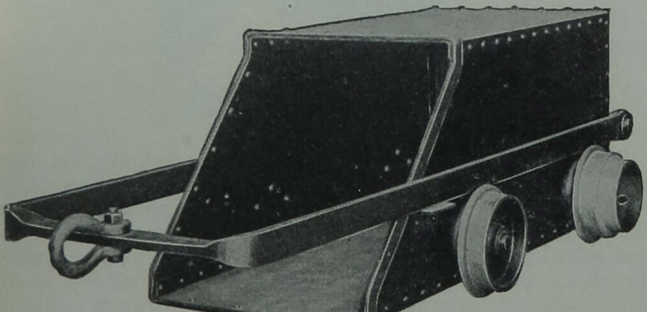
Capacity Gallons	Diameter Inches Middle	Diameter Inches Ends	Length Inches	Thickness Steel Inches	Weight Pounds	Price, Each With Side Strips	Price, Each Without Side Strips
40	20	16	36	No. 12	170	......	......
50	19	15	48	“ 12	220	......	......
60	22	18	44	“ 10	275	......	......
75	24	18	48	“ 10	325	......	......
100	26	21	52	“ 8	425	......	......
125	28	23	56	“ 8	490	......	......
150	30	24	60	3/16	590	......	......
175	32	25	64	3/16	625	......	......
200	33	26	66	3/16	770	......	......
250	36	28	69	3/16	880	......	......
300	38	30	72	3/16	935	......	......
350	40	32	76	3/16	1000	......	......

Skips



Installation of Skip

Ore and Water Skips



Ore and water skips are made in 2 styles. Above is illustrated the Style No. 2 which has the axles for the wheels riveted to the sides.

The Style No. 1 is the same as the Style No. 2, except that it has standard axles bolted on the bottom of the skip.

Skips are made to order in any size and style and when ordered for handling water, an automatic valve is furnished, which is placed in the bottom of the car.

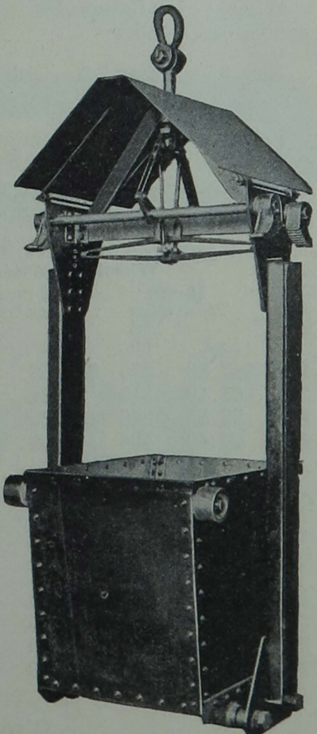
When ordering, advise the size and style desired and the angle of the incline from the perpendicular or horizontal.

No	Capacity Cu. Ft.	Thickness Steel Inches	Approx. Weight Pounds	Price, Each Style 1	Price, Each Style 2	Extra for Water Valve Each
1	10	3/16	550	$112.00	$140.00	$20.00
2	15	1/4	800	150.00	190.00	20.00
3	20	1/4	1,050	190.00	235.00	30.00
4	25	1/4	1,300	225.00	280.00	30.00
5	30	1/4	1,600	260.00	325.00	30.00

Vertical Self-dumping Skips or Buckets

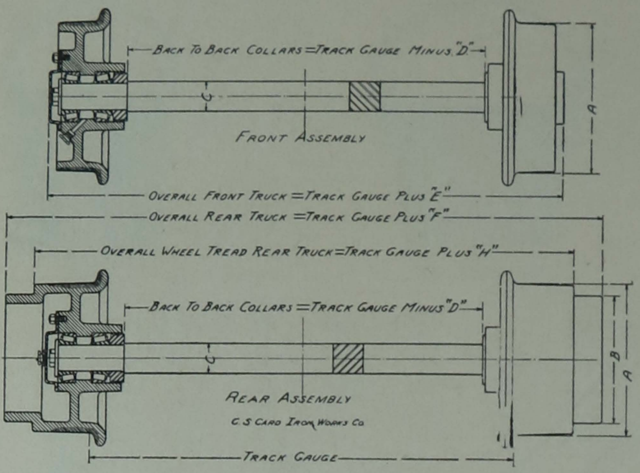
The illustration shows the heavy type skip with hinged hood. The standard type skip is practically the same as the heavy type except lighter and is not regularly furnished with the hinged cover. Covers, however, can be furnished for the standard skip when so desired, at an extra charge. Standard safety dogs are used on all self-dumping skips.

Self-dumping skips are made to order any size, to suit individual requirements.



Ore Capacity Cu. Ft.	Approx. Wt., Lbs. Standard Type	Approx. Wt., Lbs. Heavy Type	Price, Each Standard Type	Price, Each Heavy Type
20	1200	1600	$290.00	$348.00
30	1500	2000	410.00	492.00
35	1700	2265	468.00	562.00
40	2000	2665	525.00	630.00

Card Roller Bearing Skip Trucks


Back To Back Collars = Track Gauge Minus "D"
C
A
Front Assembly
Overall Front Truck = Track Gauge Plus "E"
Overall Rear Truck = Track Gauge Plus "F"
Overall Wheel Tread Rear Truck = Track Gauge Plus "H"
Back To Back Collars = Track Gauge Minus "D"
C
B
A
Rear Assembly
C. S. Card Iron Works Co
Track Gauge

An easy-running skip truck. Combines Card semi-steel heat-treated wheels and Timken roller bearings, both thoroughly time and mine tested.

The bearings are grease lubricated and protected against entrance of dirt.

Axle is of a special analysis steel.

The standard truck specifications listed below are with square axle, which can attach direct to and support the skip bottom.

Trucks with round special analysis steel axles mounted in pedestals or boxes can be furnished.

Rear wheels with a straight wide tread or with the skip ring tread a different diameter or width than the standard shown can be furnished.

Wheels with flange, 1¾ inches high can be furnished where conditions require.

Any wheel diameter, axle size, or track gage can be furnished.

Prices and weights cover a truck consisting of 4 wheels with caps, Timken roller bearings, and 2 high carbon steel axles, assembled and grease packed, ready for use.

Prices and Weights

Wheel Diameter at Rail, 10 Inches

Axle Size In.	24-inch Track Gage Each	24-inch Track Gage Wt. Lbs.	30-inch Track Gage Each	30-inch Track Gage Wt. Lbs.	36-inch Track Gage Each	36-inch Track Gage Wt. Lbs.	42-inch Track Gage Each	42-inch Track Gage Wt. Lbs.
1¾	$47.80	270	$48.35	280	$48.90	290	$49.45	300
2	51.40	315	52.15	325	52.85	340	53.55	350
2¼	55.35	345	56.25	360	57.15	375	58.05	390
2½	60.40	405	61.50	420	62.65	440	63.75	460

Wheel Diameter at Rail, 12 Inches

Axle Size In.	24-inch Track Gage Each	24-inch Track Gage Wt. Lbs.	30-inch Track Gage Each	30-inch Track Gage Wt. Lbs.	36-inch Track Gage Each	36-inch Track Gage Wt. Lbs.	42-inch Track Gage Each	42-inch Track Gage Wt. Lbs.
1¾	$51.75	380	$52.30	385	$52.85	395	$53.40	405
2	55.35	420	56.05	435	56.75	445	57.50	460
2¼	59.30	455	60.20	470	61.10	485	62.00	500
2½	64.30	510	65.40	530	66.35	550	67.65	565

Dimensions

A.....in.	10	10	10	10	12	12	12	12
B.....in.	8½	8½	8½	8½	10½	10½	10½	10½
C.....in.	1¾	2	2¼	2½	1¾	2	2¼	2½
D.....in.	4⅛	4⅜	4⅜	4⅜	4⅛	4⅜	4⅜	4⅜
E.....in.	6⅛	6⅜	6⅜	5⅞	6⅛	6⅜	6⅜	5⅞
F.....in.	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜	12⅜
H.....in.	7⅝	7⅝	7⅝	7⅝	7⅝	7⅝	7⅝	7⅝

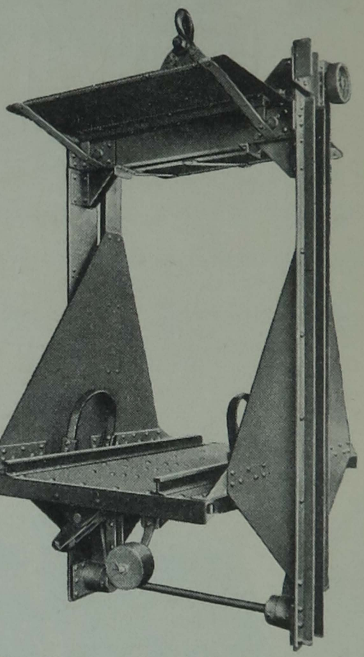
No. 50 Trip Gongs

Neat appearance and unusual strength make the No. 50 a suitable gong anywhere that one of this type and quality is required.

The gong shell is polished pressed brass; hammer and lever are cast brass; base is black japanned.

Diameter Inches	Each	Diameter Inches	Each
4	$1.05	9	$5.85
5	1.40	10	7.00
6	2.00	12	12.50
7	2.85	..	.....
8	3.85	..	.....

Automatic Self Dumping Coal Mine Cages



The illustration above shows the long radius type automatic self dumping coal mine cage. This type affords the most gradual dumping action. The cage is arranged to dump the car automatically and retain the car on the cage platform, ready for lowering in the shaft. It is equipped with automatic devise for releasing the car at the shaft bottom and is also fitted with an automatic safety devise to prevent falling in case hoisting cable should break.

Mine cages will be made up to meet your requirements.

Prices and information will be furnished upon receipt of your specifications.

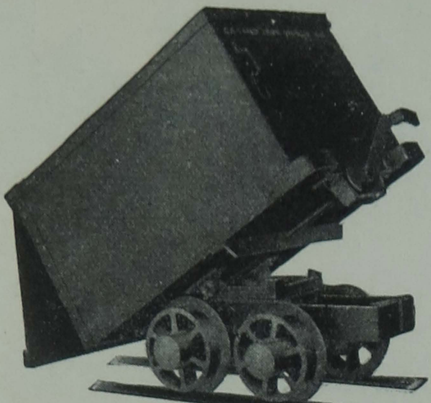
Mine SIGNAL CHARTS

We can furnish linen charts showing mine signals as approved by the state mine inspection office of the various States. Certain styles of charts will be furnished without charge.

Stonehouse SIGNS

All the various styles and types of Stonehouse Metal Signs are available for immediate delivery. Catalog sent upon request.

Card Type Z Standard Ore Cars



A standard ore car which will meet practically all ordinary conditions where a car of this style is required.

The body is well braced and balanced on the truck frame. Two angles are used to reinforce the bottom. Cars of 20-cubic foot capacity and larger are regularly furnished with 1 reinforcing strap or band in the center of the body.

Bumpers, which are used as handles when dumping, are located at the strongest part of the body. The door has a reinforcing strap at the bottom.

The turntable is semi-steel with a grease lubricated machined groove, which takes most of the load off the king pin, in turning, and is dirt-proof.

The truck frame is in one piece without riveted corners to work loose or cause trouble. It is held rigid at the top by the turntable and at the bottom by the truck.

Type Z cars are regularly equipped with Card Standard Roller Bearing Truck.

Unless otherwise specified, 18 gage cars will be furnished.

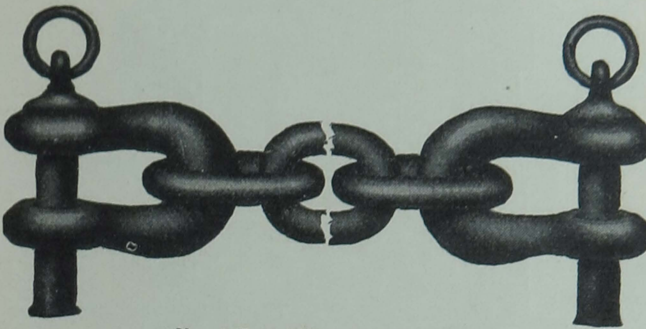
	18-inch Track Gage				**24-inch Track Gage**				
No.	Complete Each	Width Over All In.	Height Over All Above Rail, In.	Complete Wt. Lbs.	Complete Each	Width Over All In.	Height Over All Above Rail, In.	Complete Wt. Lbs.	Capacity Cu. Ft.
Z-12	**$73.00**	27½	36½	630	**$77.50**	33	37¼	670	11.7
Z-14	**76.00**	27½	40½	660	**80.50**	33	41¼	700	14.0
Z-16	**81.75**	29½	40½	730	**88.25**	33½	41¼	790	15.9
Z-18	**86.50**	33½	40½	780	**93.00**	33½	41¼	840	18.3
Z-20	**99.00**	34	42¾	1005	**105.75**	34	43½	1075	20.0
Z-22	**105.50**	34¼	42¾	1075	**112.25**	34¼	43½	1145	22.5
Z-24	**111.50**	34¼	44¾	1150	**119.00**	34½	45½	1230	24.4
Z-28	**115.25**	34¼	48¾	1200	**122.75**	34½	49½	1280	28.1

		INSIDE BODY DIMEN., IN.			STEEL THICK.				
No.	Length Over All In.	Length	Width	Depth	Bottom In.	Sides and Door Gage	Truck Wheel Diam. In.	Truck Axle Size In.	Truck Wheel Base In.
Z-12	46½	42	24	20	3⁄16	No. 10	10	1½	16
Z-14	46½	42	24	24	3⁄16	No. 10	10	1½	16
Z-16	48½	44	26	24	3⁄16	No. 10	10	1¾	16
Z-18	48½	44	30	24	3⁄16	No. 10	10	1¾	16
Z-20	52¾	48	30	24	¼	No. 10	12	2	18
Z-22	59	54	30	24	¼	3⁄16″	12	2	18
Z-24	59	54	30	26	¼	3⁄16″	12	2¼	18
Z-28	59	54	30	30	¼	3⁄16″	12	2¼	18

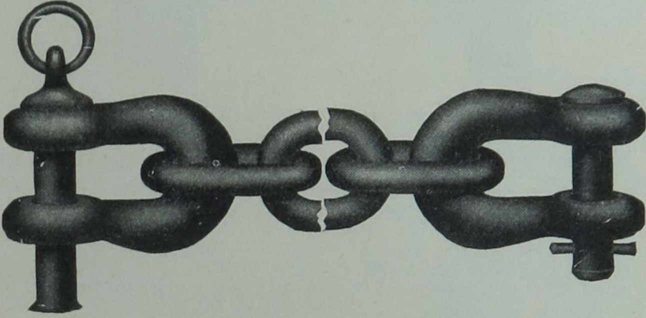
Standard Plain Solid Drawbar with Chains and Hook.
Weight, 23 Pounds.....................extra per car **$4.00**
Standard Brake, Weight, 55 Pounds....extra per car **10.00**

Drop Forged Mine Car Hitchings

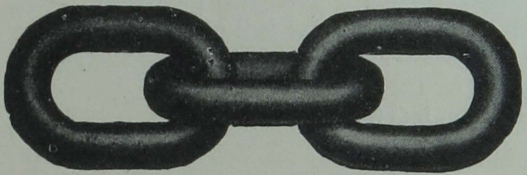
Bell Clevis Design



No 1 Bell Mine Car Hitching

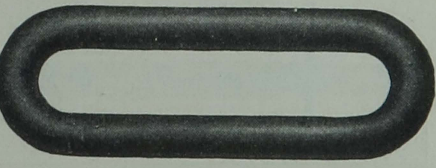


No. 2 Bell Mine Car Hitching

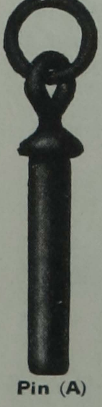


No. 6 Three Link Coupling

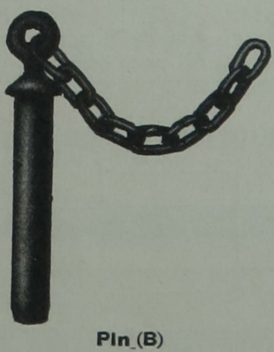
No. 8 Short Single Coupling Link



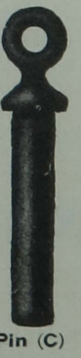
No. 7 Long Single Coupling Link



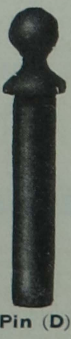
Pin (A)



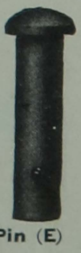
Pin (B)



Pin (C)



Pin (D)

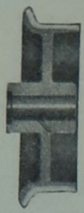


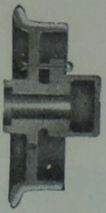
Pin (E)

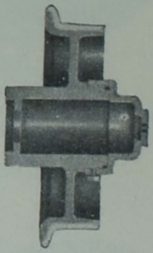
SIZE, INCHES							
Clevis	Pin	Links	Minimum C. to C. of Pins	Clevis	Pin	Links	Minimum C. to C. of Pins
1	1	¾ or ⅞	17	1⅜	1⅜	1⅛ or 1¼	21
1⅛	1⅛	⅞ " 1	18	1½	1½	1¼ " 1⅜	22
1¼	1¼	1 " 1⅛	20	...	...	....	..

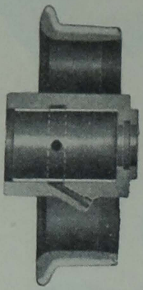
Prices will be quoted upon application.

Mine Car Wheels


Plain Bearing Open Cap


Plain Bearing Screw Cap


Roller Bearing Screw Cap

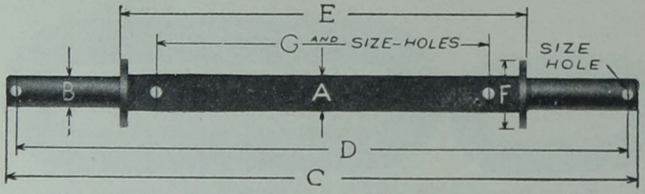

Roller Bearing without Cap

The above illustrations show a few of the designs which we can furnish. We are in position to furnish any design not covered by patents. Wheel will be made of the same high-class wheel iron as our regular equipment.

When ordering or asking for quotations, it is always best to send us a sample wheel (not too badly worn) or furnish us with full specifications.

The most important information required:
The wheel diameter (measured at the tread)
Width of wheel tread (flat face of wheel)
Bore of wheel
Length of hub
Extension of hub from the tread line.
Prices upon application.

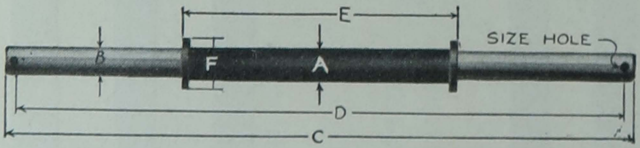
Square Mine Car Axles



The above illustration shows the square axle which is most commonly used. We are in position to furnish square axles made up to your specifications from our special axle steel.

You will note that the illustration shows the important dimensions required to duplicate any axle. If you will furnish us with the dimensions corresponding to the letters as indicated on this sketch, we will be glad to fill your order or quote you prices upon receipt of your request.

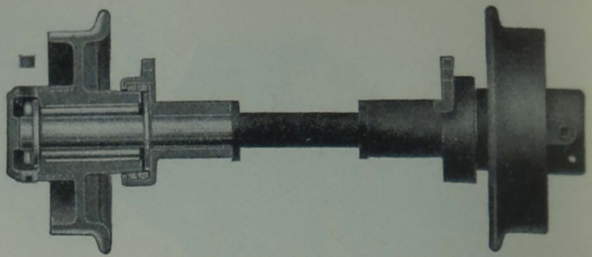
Round Mine Car Axles

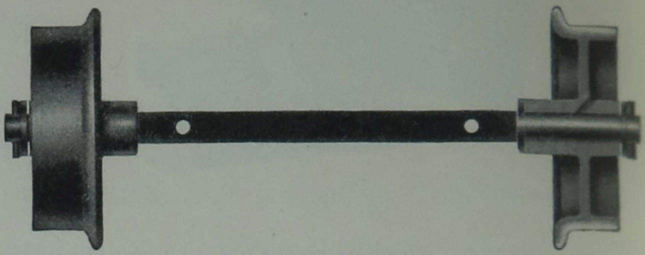


Round mine car axles are recommended on account of being free to turn in the journal boxes, thus distributing the wear evenly instead of on one side as is the case with square axles. The illustration above shows the dimensions which are necessary to make any round axle. All of our axles are made of special axle steel and will give the best of service.

In ordering or asking for prices, kindly give us the dimensions corresponding to the letters in the illustration above. Your orders or inquiries will receive prompt attention.

Card Plain and Roller Bearing Trucks


Roller Bearing Round Axle


Plain Bearing Square Axle

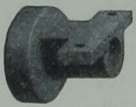
Prices and weights listed cover a truck which consists of 4 wheels with bearings, 4 pedestals and 2 axles, assembled and grease packed, ready to attach to car.

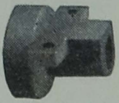
Axle clips and cross channels are extra.

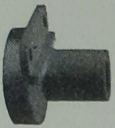
List covers a truck with standard style A, B, C pedestals; style D carries an extra.

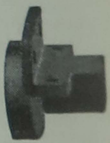
Wheel Diam. In.	Axle Size In.	Roller Bearing, Round Axles, Packed Pedestals Track Gauge 18-In. Each	Roller Bearing, Round Axles, Packed Pedestals Track Gauge 24-In. Each	Plain Bearing, Round Axles, Packed Pedestals Track Gauge 18-In. Each	Plain Bearing, Round Axles, Packed Pedestals Track Gauge 24-In. Each	Plain Bearing, Square Axles, No Pedestals Track Gauge 18-In. Each	Plain Bearing, Square Axles, No Pedestals Track Gauge 24-In. Each
1011-A	1¼	.....	.....	.....	.....	$13.85	$14.16
1011-A	1½	$25.34	$25.65	$21.48	$21.79	15.16	15.56
1011-B	1¾	27.63	28.06	23.35	23.78	16.95	17.50
1011-B	2	31.60	32.16	25.20	25.76	18.48	19.19
1011-C	2¼	34.62	35.33	27.03	27.74	20.14	21.04
1011-C	2½	39.61	40.49	30.15	31.02	22.61	23.73
1211-A	1½	27.04	27.36	23.18	23.50	16.87	17.27
1211-B	1¾	29.60	30.02	25.32	25.75	18.92	19.46
1211-B	2	33.96	34.52	27.57	28.13	20.85	21.55
1211-C	2¼	37.24	37.95	29.66	30.37	22.76	23.66
1211-C	2½	42.24	43.11	32.77	33.65	25.24	26.35
1211-D	2¾	49.05	50.10	35.70	36.75	27.87	29.22

Standard Packed Pedestals


Style A

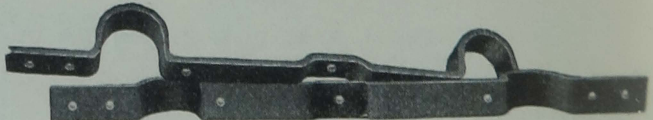

Style B


Style C


Style D

The illustrations show the 4 standard styles of pedestals regularly furnished for use with round axles.

Axle Clips



The illustration shows the standard axle clips which are used in attaching pedestals or axles to car bottoms or frames.

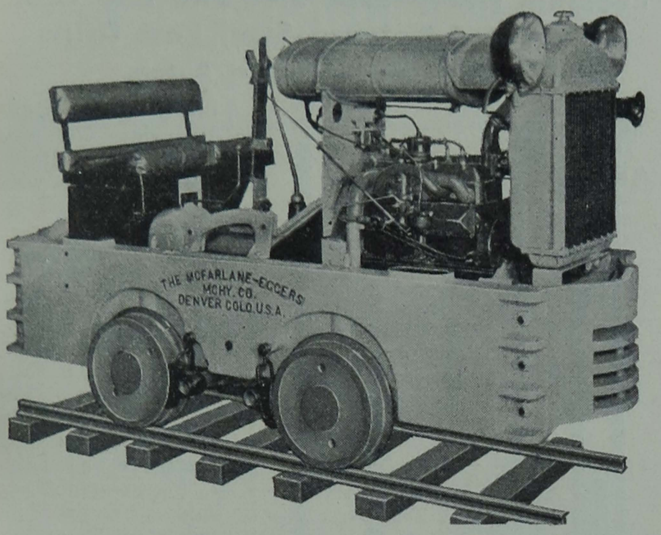
Where practical, clips are made continuous from axle to axle, helping to maintain wheel base. Also used at times with 1 short clip to a pedestal or axle and for attaching to structural frames, requiring 4 short clips to a truck.

Formed to fit either a round seat or pedestal, as shown, or the square of an axle.

Can be made to meet most any requirement.

Unless a preference is specified, clips of the proper size and weight will be furnished.

Gasoline Locomotives



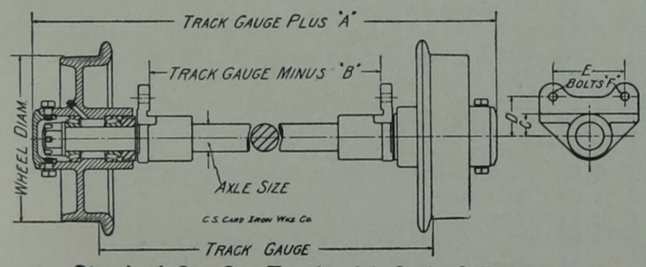
The 3-ton gasoline locomotive is a self-contained power plant. Low first cost; easy and economical in operation. It is always ready for immediate service and is of no expense while idle. Locomotive shown is equipped with a standard Model A Ford Engine. Has 3 speeds forward and reverse, with a maximum of 10 miles per hour; 4-wheel drive, hand operated, 4-wheel brakes, electric head light, signal whistle, 16-inch drives, 34-inch wheel base. Has a draw bar pull of 1200 pounds. Net hauling capacity on grades as follows: level track, 35 tons; 1% grade, 20 tons; 2%, 13 tons; 3%, 10 tons; 4% 7 tons, 5% 5 tons.

The locomotive frame is built up of heavy cast iron members, securely bolted together and carrying the 4 bearings of driver axles. Power is transmitted to drivers through steel sprockets and roller chain.

A 1½-ton locomotive can also be furnished with the standard Model A Ford Automobile Engine Power Plant, otherwise similar in design, speeds and track gages, but with about ½ the hauling capacity of the 3-ton locomotive. For lighter duty this locomotive has exceptional merit.

	3-Ton					1½-Ton				
Gage In.	Lgth. In.	Wdth. In.	Ht. In.	Contents Cu. Ft.	Ship. Wt. Lbs.	Lgth. In.	Wdth. In.	Ht. In.	Contents Cu. Ft.	Ship. Wt. Lbs.
18	104	42	56	170	6300	84	32	52	95	3300
24	104	43	56	153	6400	84	38	52	110	3300
30	104	37	56	153	6400	84	36	52	105	3300
36	104	43	56	177	6600	84	42	52	121	3500

Card Timken Roller Bearing Trucks



Standard Ore Car Truck with Style C Pedestals

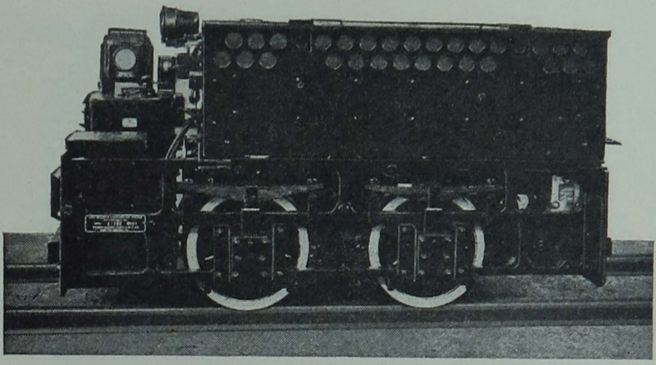
An easy running truck combining Card semi-steel heat treated wheels and Timken roller bearings.

This truck can be furnished with any size wheel, axle or bearings, and to any track gage.

Truck consists of 4 wheels with bearings, 2 axles, and 4 pedestals assembled and grease packed, ready for use.

		18 Gage		24 Gage		Dimensions, In.					
Wheel Diam. In.	Axle Size In.	Each	Weight Lbs. Each	Each	Weight Lbs. Each	A	B	C	D	E	F
10	1¾	**$34.35**	263	**$34.78**	271	9⅜	7⅜	1½	2¾	5¼	⅝
10	2	**38.00**	281	**38.56**	292	9⅜	7⅜	1⅝	2⅞	5¼	⅝
12	1¾	**36.85**	331	**37.28**	339	9⅜	7⅜	1½	2¾	5¼	⅝
12	2	**40.50**	349	**41.06**	360	9⅜	7⅜	1⅝	2⅞	5¼	⅝

No. A-6-3 Westinghouse Storage Battery Locomotives



This extremely modern locomotive is the answer to a difficult mining problem in that maximum battery and motor capacities are fitted into minimum dimensions.

The motors are specially designed to give a high continuous rating over long periods.

All electrical details have capacity proportionate to the demand placed on them by the unusually large battery.

The side frames are of cast bar steel, the only practical frame where equipment is used in close clearances.

All features have proved, in actual metal mining service, to be constructed to give satisfactory performance, low maintenance and long life.

Hand, self-locking, screw type brakes. Steel tired, 24-inch wheels. Thrust journal boxes. Steel bumper; helical gears; link and pin coupler.

Drum type control; Type TL11. 66-cell Exide Ironclad Battery. Kilowatt hour rating, 31.9.

No.	**A-6-3**
Rated Drawbar Pull . . . lbs.	1000
Speed at Rated Drawbar Pull . . . m.p.h.	3.5
Rated Voltage	80
Gage of Track	18
Will Negotiate Curves of Radius . . . ft.	12
Wheel Base . . . in.	36
Length, Excluding Bumpers . . . in.	105
Clearance, Rail to Footplate . . . in.	5
Height, Rail to Top of Frame . . . in.	29½
Height Over All . . . in.	58¼
Height, Over Battery Crate . . . in.	56¼
Width Over All . . . in.	39½
No. and Type of Motor	2-932-A-5
Motor Rating . . . h.p.	10
Gear Ratio	13:78
Weight of Chassis . . . lbs.	9500
Weight of Battery . . . lbs.	4000
Total Weight . . . lbs.	13500

Other sizes and types are available.

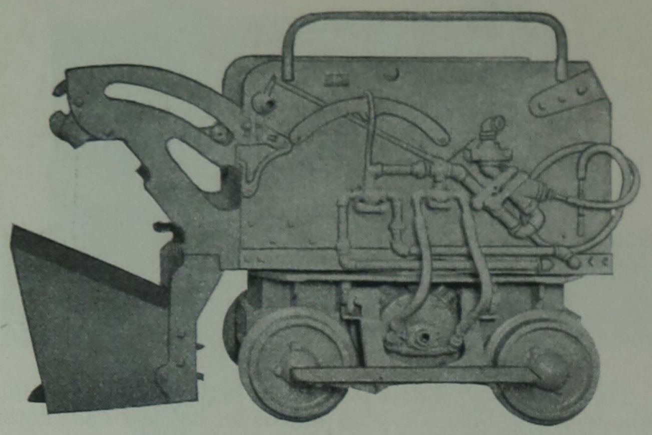
Prices upon application

Motors and Power Apparatus

Since today motor application is so varied and consequently highly specialized, we prefer to handle your inquiry through motor and power specialists who are available to work with you and your problems to our mutual advantage.

This service is yours without obligation or expense of any kind to you.

Eimco-Finlay Loaders



A perfected self-propelled mechanical shovel designed to respond to every mental process of its operator, crowding into muck piles with its dipper, digging and crowding again, loading, elevating and dumping, all with lightning rapidity, and so constructed as to give a maximum of safety.

The Model 11 will operate in the smallest of drifts or tunnels. Will go wherever a small ore car will go and under its own power. Can be shifted from one mine level to another with ease. Can be furnished to load cars having a maximum height above rails of 54 inches and of any practical length. Being no larger than the average 16-cubic foot ore car, Model 11 is suitable wherever material must be loaded in confined places, either under or above ground. Will operate in a space 4 feet wide by 5 feet 8 inches high.

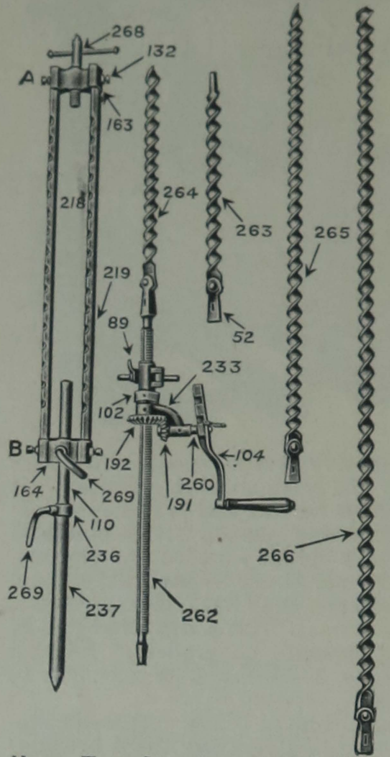
Model 20 is for use in large drifts and tunnels. Can be furnished to load cars having a maximum height above rails of 66 inches and standard car length. Self-tramming, it provides a fast flexible unit for miners and contractors. Operates with equal ease and offers the same flexibility as the Model 11.

Exclusive features insuring further speed are: No loss of time in preparation for mechanical mucking—no set up—just attach hose, turn on air and go to work; automatic alignment and elimination of human element in delivery of muck to car—no spotting necessary; free-wheeling permits easy transfer of the machine between headings or levels; no lost time; operating and maintenance costs practically eliminated; only mechanical loader that will start any distance back from working face—cleans its own tracks and handles shallow muck; does not require specialized or expert labor for operation—the average mucker becomes expert after a few hours' instruction.

Model	11	20
Each	**$2150.00**	**4250.00**
Overall Width . . . in.	30	36
Overall Length Bucket Withdrawn . . . in.	42	54
Overall Length Bucket Extended . . . in.	63	84
Overall Height Bucket Lowered . . . in.	48	55
Digging Width . . . in.	72	96
Range of Track Gage . . . in.	18 to 30	24 to 42
Air Pressure Required . . . lbs.	60 to 90	75 to 100
Air Consumption, per Minute . . . cu. ft.	30 to 70	75 to 150
Complete Loading Cycle, Average in Seconds	7	9
Loading Capacity, Average per Minute . . . cu. ft.	30 to 50	50 to 80
No. Air Motors	2	2
Air Motors . . . h.p.	5.5	10
Headroom Required Varies According to Height of Car . . . in.	68 to 78	80 to 93
Discharge Height of Bucket . . . in.	46 to 54	48 to 64
Wt. Completely Equipped . . . lbs.	3500	5500
Wt. of Heaviest Piece . . . lbs.	680	1350

Leetonia Heavy Type Side and End Gear Corrugated Notched Steel Post Drills

With Malleable Socket Augers



Heavy Type Side Gear Coal Drill

This drill will stand hard service. The post is strong and durable and is equipped with solid bar and pipe extension.

Augers have malleable sockets and are furnished either 1½, 1¾ or 2 in. in diameter. Gearing is babbitted, machined and carefully fitted together. The No. 312 and No. 29 Boxings are equipped with patented Kant Lose Key. These boxings can be tapped 6 and 8 Acme threads, or 6 and 8 Whitworth threads and 6, 8, 10 and 12 U.S. Std. threads. Bars are 1 3/16-inch diameter. The side gear bars have two grooves. End gear bars have only one groove.

In ordering be sure to give catalog no., diameter of augers, length of post from A to B, no. of threads per inch and whether Acme, Whitworth or U.S. Standard.

An extra charge will be made for drills with posts over 3 feet. Wired one in a bundle.

Approximate weight each No. 270, 82 pounds; No. 271, 75 pounds.

No. **270**, 3-Foot Post Side Gear Drill, with 2, 4, and 6-Foot Augers . . . each **$21.20**

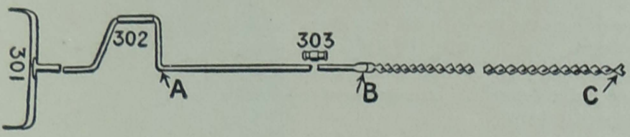
No. **271**, 3-Foot Post End Gear Drill, with 2, 4, and 6-Foot Augers . . . each **17.66**

Repair Parts

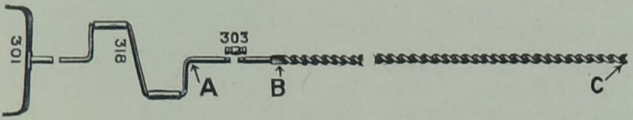
No.	Each	Description	Approx. Wt. Each Pounds
29	**$1.53**	*Boxing End Gear for 1 3/16-Inch Bars . . .	2¼
51	**2.23**	Frame, without Journal or Cog Wheels . . .	3¼
52	**4.27**	Malleable Auger Socket . . . per dozen	1
104	**1.71**	Three-Hole Handle . . .	3⅝
110	**.95**	1¼x20-Inch Steel Leg . . .	7
120	**5.80**	*Side Gear Boxing, Complete with Gearing	7¾
132	**.10**	Set Screws for Castings Nos. 163 and 164 . . .	⅛
163	**2.04**	Top Casting with Set Screws . . .	4
164	**2.04**	Bottom Casting with Set Screws . . .	5
191	**.95**	Small Cog Wheel . . .	½
192	**1.53**	**Large Cog Wheel . . .	1 1/16
218	**6.83**	†Notched Steel Post, Complete . . .	37
219	**1.03**	†Side Bar, 7 Notches per Foot . . .	8
233	**4.27**	**Gearing Complete . . .	5
236	**.95**	Boot Casting Tapped ¾-Inch . . .	1½
237	**1.11**	Boot with Casting and ¾-In. Tail Screw (1¼x20-Inch Pipe) . . .	5
260	**.78**	Journal for 233 Gearing . . .	¾
261	**3.84**	*1 3/16-In. Bar with One Groove . . .	9⅝
262	**4.27**	*1 3/16-In. Bar with Two Grooves . . .	9⅝
263	**1.85**	‡2-Ft. Ext. with No. 52 Malleable Socket . . .	5¾
264	**1.85**	‡2-Ft. Auger with No. 52 Malleable Socket .	5
265	**3.16**	‡4-Ft. Auger with No. 52 Malleable Socket .	10
266	**4.52**	‡6-Ft. Auger with No. 52 Malleable Socket .	15
267	**5.90**	‡8-Ft. Auger with No. 52 Malleable Socket .	20
268	**.95**	1⅛-In. Jack Screw (7 U.S. Std. Thrds.) . . .	2⅓
269	**.26**	¾-In. Tail Screw (10 U.S. Std. Thrds.) . . .	¾
312	**1.71**	*Boxing with Patented Kant Lose Key Fastener . . .	2¾

*Give style and no. of threads.
**State if for single or double grooved bars.
†Give length from A to B.
‡State diameter.

Breast Augers



No. 300, Single Crank



No. 319, Double Crank

Augers can be furnished in any lengths from 1¼, 1½, 1¾ and 2-inch oval auger steel. Prices are quoted on 1½-inch oval steel. For smaller sizes there will be an allowance and for larger sizes there will be an additional charge to cover cost of extra labor and value of material.

All breast augers 1½-inch and under are shipped with split points; sizes over 1½-inch are shipped with diamond points and painted with a good grade of black paint.

The length of auger is determined by measuring from A to C and the twist from B to C. In ordering, always give pattern number, quantity, length of auger and length and diameter of twist.

		Price, per Dozen			
	Length from A to C	Length of Twist from B to C		Length of Twist from B to C	
No.	Feet	3-foot	4-foot	5-foot	6-foot
300	5 and 5½	**$32.00**	**$34.00**	......	......
300	6 " 6½	**34.00**	**36.00**	**$38.00**	......
300	7	**36.00**	**38.00**	**40.00**	**$42.00**
319	6 and 6½	.....	**44.00**	**46.00**	.....
319	7	.....	**44.00**	**46.00**	**48.00**

Can be furnished with 1½-inch conveyor twists at an additional charge.

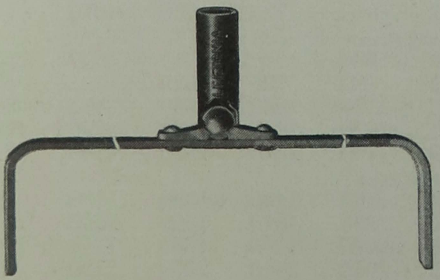
Crank Nos. 302 and 318 and Small Repair Parts

Lgth. from A to Coupling.in.	6	12	18	24
Price, No. **302**, Single Cranks ....per dozen	**$11.00**	**11.50**	**12.00**	**13.00**
Lgth. from A to Coupling..in.	30	36	.....	42
Price, No. **302**, Single Cranks ....per dozen	**$14.00**	**15.00**	.....	**16.00**

Price, No. **318**, Double Cranks, Standard Size with 6-inch Shank	per dozen	**$18.00**
Price, No. **301**, Breast Plates	"	**8.80**
" " **303**, Threaded Auger Couplings.	"	**2.40**

Give pattern number, quantity, and length only from A to couplings.

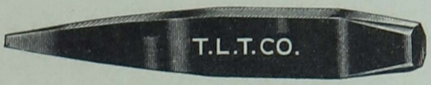
No. 301 Leetonia Ball Bearing Red Breast Breast Plates



Made of carbon steel. Between the T. socket and plate a hardened steel ball which practically eliminates all friction is used. The construction of the T. socket is such that in an instant any accumulated dirt can be removed. Any standard breast auger crank can be used with this plate. Where coal can be drilled with breast augers, the hole can be drilled in less time than it takes to get an electric drill ready. Packed 6 in a bundle.

No. **301**, Weight per Doz., 30 Pounds........per dozen **$8.80**

No. 366 Leetonia Central Pattern Coal Wedges

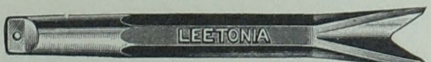


Forged broad and flat. Has flat point. Oil finish.

Wt. lbs. Under	1½	1½ & 2	2½	3	3½	4	4½	5
Each	***$.22**	**.30**	**.32**	**.35**	**.44**	**.51**	**.56**	**.63**

*Price per pound.

No. 373 Leetonia Puncher Picks



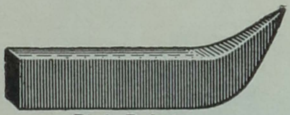
Drop forged from special analysis octagon steel. Length, 18 inches, with No. 5 Morse taper shank.

Packed on heavy wire.

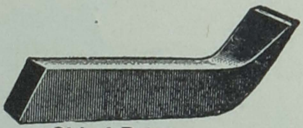
Approximate weight each, 10 pounds.

No. **373**..each **$2.00**

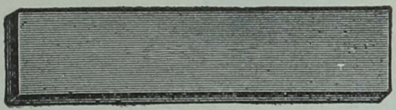
Mining Machine Bits



Pick Point



Chisel Point

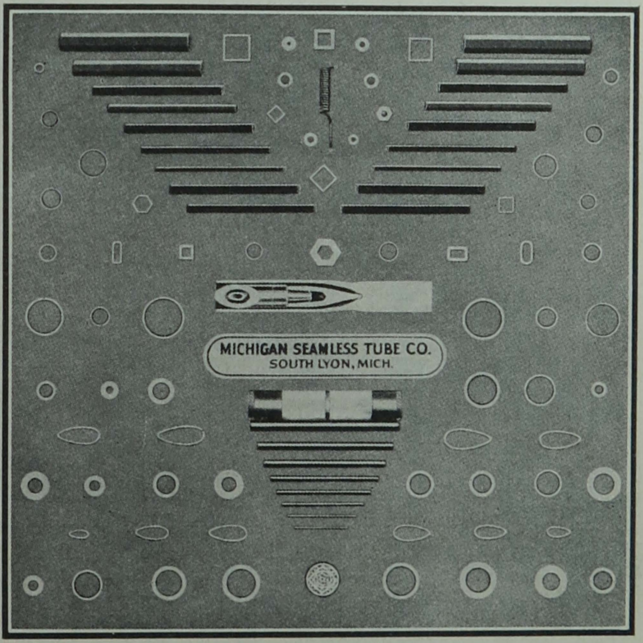


Bit Steel

Made from high carbon steel. Furnished in all styles of points. Bits are ½x¾ and ½x1-in., 4 and 4½ inches long. Steel ½x1 cut to length or bars. Specify size of bits or steel wanted. Prices upon application.

Prices upon application.

Seamless Tubing



We can furnish cold drawn tubing in many forms and to any carbon or alloy steel specifications in sizes ranging from 3/16 inch o.d. and 26 gage wall thickness.

Because of its accuracy, strength, and lightness, cold drawn seamless steel tubing is solving many hitherto perplexing engineering problems.

Cold drawn seamless steel tubing is made in much closer tolerances than that of hot finished tubing.

Prices upon application.

We Invite Your Inquiries

Coppus Blowers for Mine Ventilation

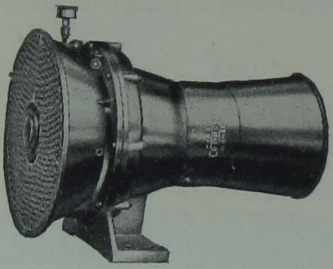
Coppus Fans furnish fresh air for the working faces, for tunnel driving, for reaching inaccessible places, for ventilating dead ends or raises, for rapid advance of main headings, eliminating cross cuts, for dilusion and expelling of dust-laden air or powder gases in a quick manner, for gangways, where gases collect at face beyond the last break-through, for driving through old workings, for reopening old mines, for rescue work in case of fire, explosion, etc. When being connected to flexible or rigid tubing, blowers deliver an ample supply of refreshing air to remote parts and out-of-the-way places, where generally the heaviest work is being done.

As Coppus Blowers are good for a maximum of about 90000 c.f.m., they can be used for main ventilation in mines of small and medium size; they take care of secondary and auxiliary ventilation in mines of any size.

Coppus Blowers will stand up for many years under the severest operating conditions, as they have been designed for rough handling.

For submitting quotations, the following information is required: Capacity in c.f.m.; length and diameter of ventilating pipe; compressed air pressure; a rough sketch showing the proposed installation. A rough sketch tells more than a long description.

Vano—Propeller Type



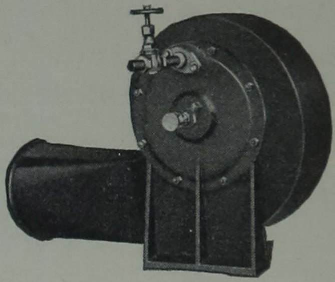
The Vano is a medium pressure propeller fan, delivering relatively large volumes of air. It operates efficiently in connection with ventilating pipes of a few hundred feet length.

Axial flow of the air, entirely unrestricted, so that the Vano is installed in a duct like a piece of pipe. Power consumption is constant at constant speed, irrespective of length and diameter of ventilating pipe. The aluminum propeller fan is equipped with guide vanes of peculiar design beyond the fan. A ring carrying the turbine buckets is shrunk around the periphery of the fan. There is only one heavy shaft supported by two oversized ball bearings, securing smooth running, perfect alignment and minimum wear.

Under 10-inch ventilating pipe of 200-ft. length, blower SP-175 gives 1120 c.f.m. with a compressed air consumption of 21 c.p.m. of free air compressed to about 75 pounds.

Weight, No. 125, 40 pounds; No. 175, 90 pounds.

Ventair—Centrifugal Type



The Ventair gives higher static pressures than the Vano and is the typical fan for longer ducts.

A centrifugal blower which embodies the latest developments in fan construction. A ring containing the turbine buckets is shrunk on back of the aluminum fan which has backward curved blades with the result of non-overload characteristics. The Ventair is of single unit design with only one heavy shaft supported by two large ball bearings.

The centrifugal blower T-4 furnishes about the same quantity of air as the Vano, 1100 c.f.m., with an air consumption of 43 cubic feet, the Vano type being far superior in this particular case. But with increasing length of the 10-inch pipe, the performance of the Ventair gains over that of the Vano, and the latter drops out entirely at 1500 feet.

Weight, T-3, 70 pounds; T-4, 75 pounds.

Capacity in Cubic Feet per Minute

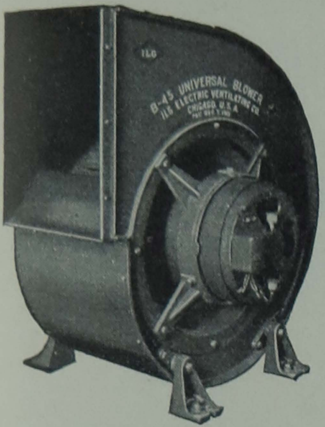
Type and Size of Blower	Length of Air Pipe, Feet													*Compressed Air Consumption
	100	200	300	400	500	600	800	1000	1200	1500	2000	2500	3000	
Air Delivery in Cubic Feet per Minute for 6-Inch Ventilating Pipe														
Vano SP-**125**	385	285	235	205	...	...	...	...	...	...	...	...	...	10
Ventair T-3	650	570	500	460	425	395	355	320	300	275	240	220	200	39
Air Delivery in Cubic Feet per Minute for 8-Inch Ventilating Pipe														
Vano SP-**125**	625	535	470	422	380	350	300	...	...	...	...	...	...	10
Vano SP-**175**	920	720	600	525	470	425	370	330	...	...	...	...	...	21
Ventair T-4	1035	900	810	745	700	660	600	555	520	475	425	385	350	43
Air Delivery in Cubic Feet per Minute for 10-Inch Ventilating Pipe														
Vano SP-**175**	1350	1120	965	860	775	700	600	530	475	...	...	...	...	21
Ventair T-4	1200	1100	1020	960	915	875	810	760	720	670	610	560	520	43
Ventair T-5	1850	1570	1390	1270	1180	1120	1020	940	880	810	725	660	610	69
Air Delivery in Cubic Feet per Minute for 12-Inch Ventilating Pipe														
Vano SP-**175**	1575	1425	1310	1215	1135	1070	960	870	790	680	...	...	...	21
Vano SP-**250**	2700	2180	1880	1670	1520	1400	1220	1090	990	880	735	620	...	52
Ventair T-5	2100	1900	1760	1650	1570	1500	1385	1290	1220	1130	1030	950	885	69
Ventair T-6	3520	3140	2870	2650	2480	2330	2110	1940	1810	1670	1490	1360	1240	170
Ventair T-8	4720	3960	3450	3100	2840	2650	2360	2120	1950	1760	1540	1380	1260	270
Air Delivery in Cubic Feet per Minute for 16-Inch Ventilating Pipe														
Vano SP-**250**	3770	3450	3180	2920	2720	2540	2270	2050	1880	1700	1490	1320	1190	52
Vano SP-**300**	5150	4480	3975	3570	3250	3000	2625	2350	2140	1925	1670	1500	1360	105
Vano SP-**350**	6460	5300	4450	3930	3530	3270	2870	2570	2340	2090	1800	1580	1440	170
Ventair T-6	3880	3730	3590	3470	3370	3270	3100	2950	2820	2660	2440	2270	2120	170
Ventair T-8	5700	5300	4940	4660	4420	4220	3900	3650	3420	3150	2830	2580	2380	270

*Air consumption in cubic feet of free air per minute compressed to 75 pounds.

Detailed information on longer or intermediate lengths furnished upon application.

Prices upon Application

Ilg Type B Universal Blowers



The motor is machined circular and held in a cast iron ring and recessed within the cast iron side of the blower in a sheet steel bowl. The multiblade wheel is mounted directly in the motor shaft. There is little overhang because the motor is recessed. This construction eliminates the inlet bearing, independent motor base and alignment of motor and wheel. Mounted on 4 legs, the Ilg Blower is quickly installed the universal discharge is possible by relocation of the legs.

All direct current blowers are furnished with speed regulators and covers.

Give current, voltage, cycle and phase—specify discharge arrangement on order.

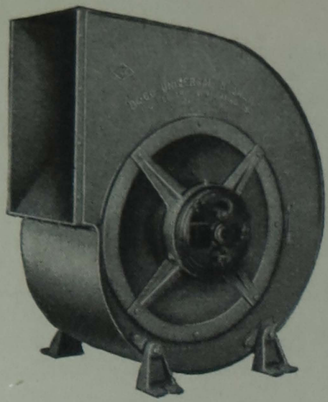
Direct-Connected

		A.C. 2 & 3 Ph. 60 Cy. Constant Speed			D.C.			Single Phase, A.C. 1 Ph. 60 Cy. Constant Speed		
Size	R.P.M.	220 or 440 Volts	550 Volts	Ship Wt. Lbs.	110 or 220 Volts	500 Volts	Ship Wt., Lbs.	110 Volts	220 Volts	Ship. Wt., Lbs.
B25	685	$185.00	$205.00	220	$270.00	$290.00	240	$254.00	$211.00	250
B25	855	215.00	235.00	220	320.00	340.00	360	290.00	244.00	250
B25	1140	254.00	274.00	295	420.00	440.00	360	......	......	...
B30	685	289.00	309.00	350	410.00	430.00	410	363.00	330.00	405
B30	855	319.00	339.00	380	481.00	501.00	410	......	......	...
B30	1140	388.00	408.00	460	580.00	600.00	650	......	......	...
B35	570	339.00	359.00	470	518.00	538.00	510	424.00	385.00	550
B35	685	360.00	380.00	470	636.00	656.00	670	......	410.00	550
B35	855	424.00	444.00	470	680.00	700.00	670	......	......	...
B40	570	413.00	433.00	630	678.00	698.00	780	......	......	...
B40	685	483.00	503.00	650	772.00	792.00	850	......	505.00	725
B40	855	540.00	570.00	650	980.00	1110.00	925	......	......	...
B45	490	517.00	547.00	750	764.00	784.00	990	......	575.00	850
B45	570	567.00	597.00	800	884.00	904.00	1050	......	666.00	850
B45	685	674.00	704.00	920	910.00	930.00	1050	......	......	...
B50	490	656.00	686.00	955	890.00	920.00	1160	......	805.00	1040
B50	570	708.00	738.00	955	1040.00	1090.00	1410	......	......	...
B55	425	730.00	760.00	1150	957.00	987.00	1560	......	......	...
B55	570	904.00	934.00	1375	1060.00	1080.00	1830	......	......	...
B60	380	840.00	870.00	1375	952.00	992.00	1850	......	......	...
B60	490	966.00	1006.00	1575	1265.00	1305.00	2050	......	......	...
B70	340	1234.00	1274.00	2050	1412.00	1452.00	2500	......	......	...
B70	380	1272.00	1312.00	2050	1425.00	1465.00	2500	......	......	...
B70	425	1330.00	1370.00	2050	1562.00	1617.00	2750	......	......	...
B80	285	1562.00	1607.00	2850	1632.00	1672.00	3200	......	......	...
B80	340	1652.00	1697.00	2850	1760.00	1820.00	3625	......	......	...
B90	245	1702.00	1746.00	3325	2200.00	2245.00	3750	......	......	...
B90	285	1763.00	1823.00	3325	2385.00	2445.00	4150	......	......	...
B90	310	2289.00	2349.00	3625	2695.00	2755.00	4550	......	......	...

Speed, Capacity and Brake H.P. at Various Pressures—For 60 Cycle and D.C.

			Static Pressure, Inches															
			1/8		1/4		3/8		1/2		5/8		3/4		7/8		1		1 1/8	
Size	R.P.M.	Wheel Diam. In.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.
B25	685	12 3/4	1750	.29	1580	.26	1400	.23	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
B25	855	12 3/4	2265	.58	2135	.54	2000	.51	1860	.47	1715	.44	.....	....	.....	....	.....	....	.....	....
B25	1140	12 3/4	.....	....	.....	....	.....	....	.....	....	2700	1.23	2600	1.18	2490	1.13	2390	1.09	2280	1.04
B30	685	15 1/2	3310	.80	3110	.75	2910	.71	2690	.65	2455	.60	.....	....	.....	....	.....	....	.....	....
B30	855	15 1/2	.....	....	.....	....	.....	....	.....	....	3550	1.32	3380	1.26	3200	1.19	3000	1.12	2795	1.04
B30	1140	15 1/2	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....	.....	....
B35	570	18 1/4	3744	.71	3440	.66	3130	.60	2770	.54	.....	....	.....	....	.....	....	.....	....	.....	....
B35	685	18 1/4	4640	1.28	4395	1.20	4140	1.14	3880	1.06	3600	1.00	3285	.91	.....	....	.....	....	.....	....
B35	855	18 1/4	.....	....	.....	....	.....	....	.....	....	5090	2.16	4880	2.07	4665	2.00	4440	1.90	4190	1.79
B40	570	21	5890	1.49	5530	1.40	5180	1.32	4800	1.22	4432	1.13	3970	1.02	.....	....	.....	....	.....	....
B40	685	21	.....	....	.....	....	.....	....	6340	2.33	6030	2.22	5720	2.15	5370	1.98	5000	1.85	4560	1.69
B40	855	21	.....	....	.....	....	.....	....	.....	....	8200	4.65	7920	4.51	7740	4.40	7470	4.25	7200	4.10
B45	490	23 3/4	7330	1.72	6875	1.60	6400	1.51	5900	1.40	5070	1.21	4660	1.12	.....	....	.....	....	.....	....
B45	570	23 3/4	8720	2.75	8340	2.64	7940	2.52	7530	2.40	7080	2.25	6620	2.12	.....	....	.....	....	.....	....
B45	685	23 3/4	.....	....	.....	....	.....	....	.....	....	9300	4.40	8950	4.25	8620	4.09	8250	3.92	7850	3.74
B50	490	26 1/2	10420	3.05	9900	2.90	9380	2.75	8850	2.60	8300	2.45	7680	2.26	.....	....	.....	....	.....	....
B50	570	26 1/2	.....	....	.....	....	.....	....	.....	....	10450	4.18	10000	4.00	9520	3.83	9000	3.50	8400	3.41
B55	425	29 1/4	12180	3.32	11550	3.15	10850	2.99	10150	2.79	9370	2.58	8550	2.35	.....	....	.....	....	.....	....
B55	570	29 1/4	.....	....	.....	....	.....	....	.....	....	14680	7.15	14150	6.91	13620	6.66	13100	6.40	12520	6.14
B60	380	32	14200	3.60	13400	3.40	12550	3.20	11700	3.00	10720	2.76	9600	2.49	.....	....	.....	....	.....	....
B60	490	32	.....	....	.....	....	.....	....	.....	....	16100	6.82	15450	6.55	14770	6.30	14070	6.00	13300	5.70
B70	340	37 1/2	20720	5.80	19700	5.52	18550	5.21	17430	4.52	16230	4.60	14970	4.23	.....	....	.....	....	.....	....
B70	380	37 1/2	.....	....	.....	....	.....	....	20400	7.18	19410	6.82	18400	6.48	17220	6.10	16000	5.68	14500	5.17
B70	425	37 1/2	.....	....	.....	....	.....	....	.....	....	23080	10.1	22200	9.75	21280	9.32	20250	8.91	19230	8.50
B80	285	43	26100	6.70	24600	6.31	23050	5.92	21480	5.52	19800	5.10	17880	4.63	.....	....	.....	....	.....	....
B80	340	43	.....	....	.....	....	.....	....	.....	....	26820	9.90	25500	9.40	24130	8.90	22600	8.38	20790	7.70
B90	245	48 1/2	32100	7.70	30150	7.25	28100	6.80	26000	6.30	23750	5.78	21000	5.12	.....	....	.....	....	.....	....
B90	285	48 1/2	.....	....	.....	....	.....	....	33000	10.7	31250	10.2	29420	9.66	27250	8.95	24800	8.17	.....	....
B90	310	48 1/2	.....	....	.....	....	.....	....	.....	....	35500	13.9	33900	13.2	32150	12.6	30350	11.9	28300	11.2

Type BC Ilg Blowers



Non-overloading characteristics have been brought to a high state of development in the Ilg Type BC Blowers. The motor load remains constant for a large range of air volume over a considerable change in static pressure.

This feature is of distinct value to the architect, the engineer and contractor in installations where the actual resistance in the system does not agree with the calculated figure for there is not a chance of a motor overload in case the resistance is less than calculated.

Blower has high efficiency available in direct-connected and belted single width, single inlet types and belted double width, double inlet type. The discharge is universal.

Enclosed speed regulators furnished with direct current blowers.

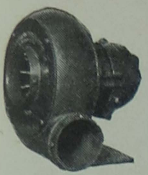
For frequencies other than 60 cycle add 5%.

		Direct Connected								Belted			
		60 Cycle A.C.					D.C.			Single Width Single Inlet		Double Width Double Inlet	
		2 & 3 Phase		1 Phase									
Size	R.P.M.	220 or 440 Volts	550 Volts	110 Volts	220 Volts	Ship. Wt. Lbs.	110 or 220 Volts	550 Volts	Ship. Wt. Lbs.	Each	Wt. Lbs.	Each	Wt. Lbs.
BC25	1140	$200.00	$215.00	$247.00	$225.00	220	$214.00	$229.00	230	......	...	......	...
BC25	1750	205.00	220.00	299.00	240.00	220	287.00	302.00	230	$112.00	175	......	...
BC30	1140	220.00	235.00	294.00	248.00	300	242.00	257.00	310	......	...	......	...
BC30	1750	224.00	239.00	......	283.00	300	249.00	264.00	330	136.00	225	......	...
BC35	855	238.00	258.00	313.00	266.00	350	268.00	288.00	360	......	...	......	...
BC35	1140	245.00	265.00	379.00	287.00	350	365.00	385.00	375	......	...	......	...
BC35	1750	405.00	425.00	......	......	480	604.00	624.00	530	176.00	295	......	...
BC40	855	265.00	285.00	407.00	311.00	500	389.00	409.00	525	......	...	......	...
BC40	1140	354.00	374.00	......	419.00	530	581.00	601.00	580	......	...	......	...
BC40	1750	517.00	537.00	......	......	625	841.00	861.00	725	220.00	425	......	...
BC45	685	373.00	393.00	......	418.00	650	558.00	578.00	700	......	...	......	...
BC45	855	379.00	399.00	......	440.00	650	583.00	603.00	700	......	...	......	...
BC45	1140	460.00	480.00	......	......	750	703.00	723.00	880	260.00	550	......	...
BC50	685	467.00	487.00	......	529.00	800	604.00	624.00	850	......	...	......	...
BC50	855	482.00	502.00	......	578.00	875	788.00	808.00	1000	......	...	......	...
BC50	1140	563.00	583.00	......	......	900	992.00	1012.00	1090	314.00	725	$580.00	925
BC55	570	450.00	470.00	......	505.00	950	640.00	660.00	1000	......	...	......	...
BC55	685	487.00	507.00	......	572.00	950	669.00	689.00	1000	......	...	......	...
BC55	855	500.00	520.00	......	......	980	788.00	808.00	1080	360.00	850	674.00	1075
BC60	570	484.00	504.00	......	552.00	1200	781.00	801.00	1330	......	...	......	...
BC60	685	520.00	540.00	......	650.00	1200	910.00	930.00	1420	......	...	......	...
BC60	855	596.00	626.00	......	......	1225	1325.00	1355.00	1580	406.00	1025	752.00	1275
BC70	570	861.00	891.00	......	......	1600	1132.00	1152.00	1760	......	...	......	...
BC70	685	985.00	1015.00	......	......	1625	1533.00	1563.00	1920	......	...	......	...
BC70	855	1283.00	1313.00	......	......	1850	2152.00	2192.00	2450	458.00	1400	940.00	1825
BC80	490	1164.00	1194.00	......	......	2000	1725.00	1755.00	2295	......	...	......	...
BC80	570	1295.00	1325.00	......	......	2100	1915.00	1945.00	2455	......	...	......	...
BC80	685	1450.00	1480.00	......	......	2250	2280.00	2320.00	2850	584.00	1800	1240.00	2375
BC90	490	1740.00	1770.00	......	......	2700	2552.00	2592.00	3300	......	...	......	...
BC90	570	1758.00	1798.00	......	......	3000	2596.00	2636.00	3300	......	...	......	...
BC90	685	1782.00	1822.00	......	......	3000	2907.00	2957.00	3500	720.00	2400	1608.00	3200

Speed, Capacity and Brake H.P. at Various Pressures for 60 Cy. and D.C.—Direct Connected

		Static Pressure, Inches																			
		¼		½		¾		1		1¼		1½		1¾		2		2½		3	
Size	R.P.M.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.	C.F.M.	H.P.
BC25	1140	1050	.10	825	.10	550	.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC25	1750	1790	.37	16.0	.37	1520	.37	1375	.37	1225	.37	1065	.37	860	.36	.....	.....	.....	.....	.....	.....
BC30	1140	2010	.28	1760	.28	1480	.28	1200	.27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC30	1750	3300	.99	3135	.99	2960	.99	2785	.99	2610	.99	2440	.99	2260	.99	2090	.99	1695	.98	.....	.....
BC35	855	2350	.30	1950	.30	1500	.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC35	1140	3400	.60	3100	.60	2800	.60	2475	.60	2150	.60	1750	.58	.....	.....	.....	.....	.....	.....	.....	.....
BC35	1750	5470	2.22	5300	2.22	5100	2.22	4900	2.22	4700	2.22	4500	2.22	4300	2.22	4080	2.22	3650	2.22	3225	2.22
BC40	855	3750	.55	3280	.55	2800	.55	2250	.55	1300	.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC40	1140	5300	1.25	4950	1.25	4600	1.25	4240	1.25	3850	1.25	3480	1.25	3100	1.25	2625	1.24	.....	.....	.....	.....
BC40	1750	8375	4.52	8160	4.52	7950	4.52	7720	4.52	7500	4.52	7260	4.52	7050	4.52	6800	4.52	6350	4.52	5850	4.52
BC45	685	4220	.50	3600	.50	2850	.50	1800	.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC45	855	5570	.98	5050	.98	4500	.98	3950	.98	3400	.98	2500	.92	.....	.....	.....	.....	.....	.....	.....	.....
BC45	1140	7700	2.31	7300	2.31	6900	2.31	6500	2.31	6100	2.31	5660	2.31	5250	2.31	4850	2.31	3900	2.31	.....	.....
BC50	685	6050	.85	5300	.85	4500	.85	3750	.85	2000	.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC50	855	7850	1.65	7250	1.65	6660	1.65	6100	1.65	5450	1.65	4850	1.65	4050	1.65	.....	.....	.....	.....	.....	.....
BC50	1140	10780	3.93	10350	3.93	9890	3.93	9450	3.93	9000	3.93	8500	3.93	8070	3.93	7600	3.93	6700	3.93	5650	3.9
BC55	570	6600	.82	5600	.82	4580	.82	3300	.82	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC55	685	8300	1.42	7500	1.42	6650	1.42	5800	1.42	4900	1.42	3600	1.32	.....	.....	.....	.....	.....	.....	.....	.....
BC55	855	10700	2.77	10000	2.77	9370	2.77	8700	2.77	8010	2.77	7350	2.77	6690	2.77	6000	2.77	.....	.....	.....	.....
BC60	570	8900	1.27	7750	1.27	6600	1.27	5500	1.27	3800	1.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
BC60	685	11020	2.22	10100	2.22	9200	2.22	8250	2.22	7300	2.22	6400	2.22	5100	2.10	.....	.....	.....	.....	.....	.....
BC60	855	14200	4.30	13500	4.30	12750	4.30	12000	4.30	11250	4.30	10500	4.30	9750	4.30	9000	4.30	7400	4.30	.....	.....
BC70	570	14700	2.85	13400	2.85	12200	2.85	10800	2.85	9500	2.85	8150	2.85	5500	2.50	.....	.....	.....	.....	.....	.....
BC70	685	18150	4.85	17100	4.85	16000	4.85	14900	4.85	13800	4.85	12800	4.85	11700	4.85	10600	4.85	6500	4.2	.....	.....
BC70	855	23180	9.55	22250	9.55	21400	9.55	20500	9.55	19650	9.55	18800	9.55	17950	9.55	17100	9.55	15300	9.55	13600	9.55
BC80	490	19100	3.57	17350	3.57	15600	3.57	13900	3.57	12150	3.57	10100	3.57	.....	.....	.....	.....	.....	.....	.....	.....
BC80	570	22700	5.60	21250	5.60	19800	5.60	18300	5.60	16800	5.60	15300	5.60	13800	5.60	12100	5.60	.....	.....	.....	.....
BC80	685	27900	9.70	26600	9.70	25400	9.70	24150	9.70	22900	9.70	21700	9.70	20400	9.70	19200	9.70	16750	9.70	13750	9.70
BC90	490	27700	6.50	25800	6.50	23900	6.50	22000	6.50	20000	6.50	18000	6.50	16000	6.50	13400	6.40	.....	.....	.....	.....
BC90	570	33000	10.20	31300	10.20	29600	10.20	28000	10.20	26200	10.20	24500	10.20	22800	10.20	21100	10.20	17600	10.20	.....	.....
BC90	685	40250	17.60	38800	17.60	37500	17.60	36000	17.60	34700	17.60	33200	17.60	31800	17.60	30500	17.60	27600	17.60	24800	17.60

Type P Volume Blowers



The Ilg Direct-Connected Electric Volume Blower is applicable for exhausting dust and fumes from laboratories and polishing rooms, removal of steam and heavy vapors from cooking vats in dye houses, breweries, canning factories, etc.

The discharge can be changed to 4 different positions, making it possible to install the blower from different angles. Housing is of cast-iron and wheel of cast aluminum, steel or cast-iron as desired.

Blower Size No.	Rated R.P.M.	Outlet Diam. In.	Inlet Diam. In.	Blower Size No.	Rated R.P.M.	Outlet Diam. In.	Inlet Diam. In.
7½P	3400	3	4⅞	**15P**	1720	5	5⅞
10P	*1420	3⅝	5½	**20P**	*1420	6¾	7¾
10P	1720	3⅝	5½	**20P**	1720	6¾	7¾
15P	*1420	5	5⅞	....	....	...	...

*1420 speed on 25 cycle only.

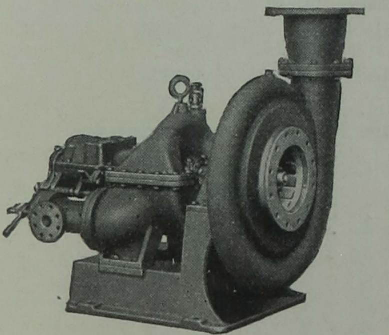
Performance Table

Size In.	Free Air CFM.	Static Pressure in Inches of Water ¼ CFM	¼ Watts Input	½ CFM	½ Watts Input	¾ CFM	¾ Watts Input
7½P	225	215	190	210	190	200	185
10P	205	175	100	145	90	100	85
10P	300	270	150	235	149	200	148
15P	375	320	130	250	105	185	95
15P	450	415	230	375	215	330	200
20P	1090	1030	460	939	440	920	420
20P	1310	1180	820	1130	780	1085	765

Size In.	Static Pressure in Inches of Water 1 CFM	1 Watts Input	1½ CFM	1½ Watts Input	2 CFM	2 Watts Input	3 CFM	3 Watts Input
7½P	190	180	165	175	135	170	70	150
10P	50	80	0	...	...	...	...	...
10P	160	146	85	138	0	...	...	...
15P	110	90	0	...	...	...	...	...
15P	280	190	150	165	0	...	...	...
20P	850	390	710	340	550	280	0	...
20P	1040	740	945	685	845	635	600	510

Roots-Connersville Centrifugal Blowers and Exhausters

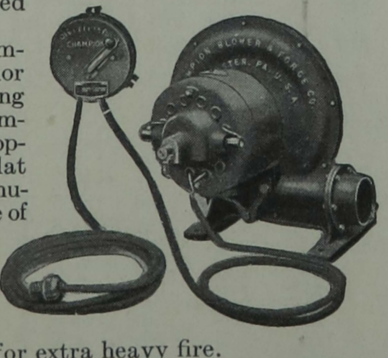
Single-Stage Units



For handling air or gas under pressure or vacuum. Open or closed impellers, usually cast of aluminum alloy. Standard casings of cast iron. Throttling or damper valves provided in blower inlet. Renewable, split cast iron sleeve, babbitted type bearings.

Operated at speeds suitable for direct connection to steam turbines. Has 8 outlet positions. Supplied in a wide range of capacities and pressures. Prices upon application.

Champion Electric Steel Pressure Blowers



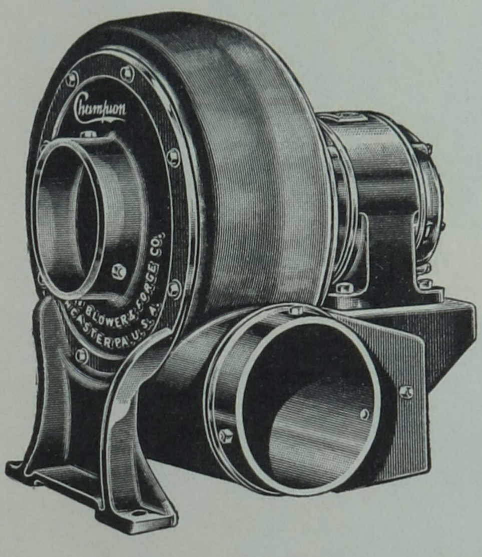
A one-fire variable speed electric blower.

Motor is built with hammered steel shaft, phosphor bronze bearings, self-aligning and self-oiling bearings, commutator of hard drawn copper with 24 bars, large flat brushes staggered on commutator and silk covered wire of best insulation.

Furnished with universal motor wound for both a.c. and d.c., either 110 or 220 volts. No. 50 if for regular fire; No. 51 for extra heavy fire.

No.	Speed, R.P.M.	Outlet, In.	Ht., In.	Wt., Lbs.	Price, Ea.
50	2050	3	15	60	**$37.50**
51	2475	3	15	70	**48.50**

Type BE Champion Universal Electric-Driven Fans



Can be used as an exhaust fan or a volume blower. Has a motor bed plate so arranged it is adjustable to take the proper center distances of various style motors.

Can be furnished complete with motor, or less motor, ready to attach any make of motor, if so desired.

Fan No.	110 V. A.C. or 220 V. S.P. Each	2 or 3 Phase Each	115 V. or 230 V. D.C. Each	R.P.M.	H.P.
1BE	**$60.00**	**$75.00**	**$82.00**	1750	¼
1BE	**90.00**	**90.00**	**125.00**	3450	½
2BE	**90.00**	**90.00**	**145.00**	1750	⅓
2BE	**175.00**	**145.00**	**250.00**	3450	2
3BE	**113.00**	**117.00**	**185.00**	1140	⅛
3BE	**112.00**	**120.00**	**150.00**	1750	½
3BE	**260.00**	**173.00**	**270.00**	3450	3
4BE	**160.00**	**140.00**	**200.00**	1140	½
4BE	**193.00**	**163.00**	**193.00**	1750	1
4BE	......	**250.00**	**400.00**	3450	7½
5BE	......	**165.00**	**240.00**	870	½
5BE	**185.00**	**162.00**	**210.00**	1140	¾
5BE	**215.00**	**170.00**	**290.00**	1750	2
6BE	......	**200.00**	**275.00**	870	¾
6BE	**215.00**	**175.00**	**300.00**	1140	1
6BE	**277.00**	**198.00**	**310.00**	1750	3
7BE	......	**275.00**	**410.00**	870	2
7BE	**550.00**	**330.00**	**595.00**	1140	5
7BE	......	**400.00**	**600.00**	1750	10
8BE	......	**500.00**	......	490	2
8BE	......	**420.00**	**600.00**	870	5
8BE	**750.00**	**420.00**	**600.00**	1140	7½

Capacities, Speeds and Horsepower

	1″ S.P. .58 Oz.			2″ S.P. 1.16 Oz.			3″ S.P. 1.73 Oz.		
No.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.
1B	185	1760	.06	260	2490	.15	320	3060	.25
2B	280	1410	.08	402	1990	.24	490	2470	.38
3B	480	1090	.15	660	1535	.34	820	1880	.65
4B	600	920	.17	800	1310	.46	1000	1610	.88
5B	740	860	.22	1000	1230	.58	1250	1500	1.05
6B	910	780	.25	1285	1110	.65	1580	1360	1.25
7B	1330	640	.35	1880	910	1.00	2295	1120	1.78
8B	2240	500	.68	3180	710	1.70	3890	870	3.00

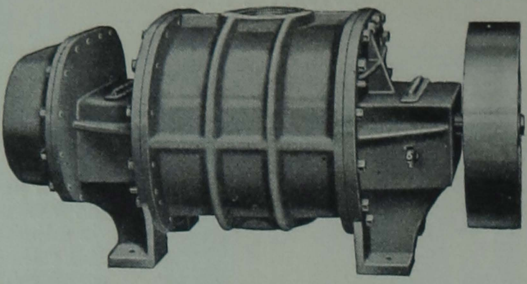
	4″ S.P. 2.31 Oz.			5″ S.P. 2.89 Oz.			6″ S.P. 3.47 Oz.		
No.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.
1B	360	3540	.38	400	3930	.52	...	....	....
2B	570	2820	.60	620	3160	.90	690	3460	1.10
3B	940	2170	1.00	1050	2430	1.40	1175	2670	1.78
4B	1200	1850	1.20	1300	2070	1.85	1400	2270	2.35
5B	1460	1750	1.58	1650	1980	2.20	1750	2090	2.80
6B	1820	1575	1.85	2038	1750	2.60	2230	1920	3.30
7B	2650	1295	2.70	2970	1450	3.80	3250	1590	4.95
8B	4490	1020	4.55	5030	1120	6.40	5496	1225	8.20

	7″ S.P. 4.05 Oz.			8″ S.P. 4.62 Oz.			9″ S.P. 5.19 Oz.		
No.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.
2B	748	3730	1.32	795	3990	1.65	....	....	....
3B	1250	2870	2.25	1340	3070	2.75	1410	3250	3.30
4B	1550	2450	3.05	1700	2620	3.86	1800	2780	4.50
5B	1900	2260	3.65	2100	2420	4.60	2200	2560	5.30
6B	2400	2070	4.25	2560	2220	5.20	2750	2350	6.20
7B	3495	1715	6.25	3740	1830	7.80	3990	1940	9.10
8B	5900	1325	10.80	6310	1415	12.98	6740	1500	15.30

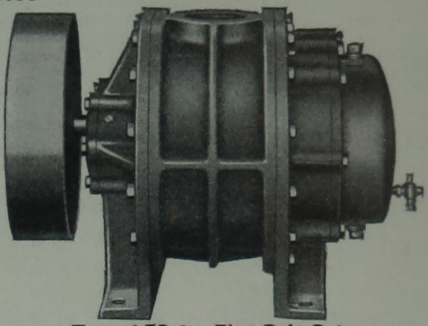
Victor-Acme Rotary Positive Blowers

For Pressure or Vacuum Service

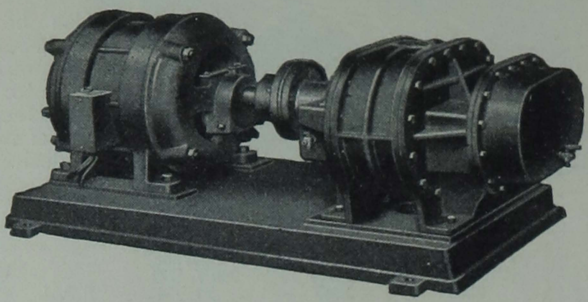
Types SB and AFS



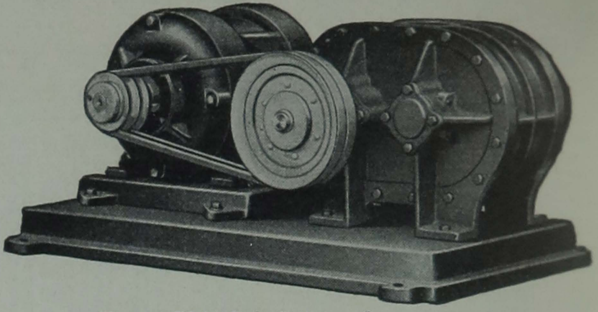
Type SB with Single Pulley



Type AFS for Flat Belt Drive



Type SB Direct-Coupled to Motor



Type AFS V-Belt Driving Arrangement

Since the impellers displace a known volume of air each revolution, a speed may be selected to deliver the required amount of air. At constant speed, this volume will remain the same, although resistance to flow may be increased. If a different volume is desired, it is only necessary to change the r.p.m. of the blower, within its rated limits, through the use of vari-speed drives, multi-speed motors, or by merely changing the pulley or sheave. A corresponding reduction in power will result.

The impellers are fitted to each other and the surrounding casing with small, accurately gaged clearances. There is no internal friction, and no internal lubricant is needed. On the other hand, the clearances are small and no seal is required for normal duty.

Impellers are accurately machined from one piece, close-grained, gray iron castings. Shafts of extra strength, high carbon steel are pressed into and securely fastened in the impellers, which are then carefully balanced.

In Type SB Blower the bearings are long sleeves of special bearing bronze, lubricated by rings dipping in the large oil reservoirs just below the bearing. The timing gears are accurately cut from solid, cast semi-steel blanks.

Type AFS Blowers are fitted with heavy duty, sealed type anti-friction bearings, and with timing gears formed from forged alloy steel blanks and heat treated for added strength. This type of construction is recommended for heavier service as indicated in the capacity table below.

Blowers displace a definite volume each revolution of the impellers. The capacity of each size blower is shown at two or more speeds and pressures. For intermediate speeds and pressures, the approximate volume and power may be obtained by proportionate ratio.

Note.—The ratings at the left of the heavy vertical line applies to either type of blowers. The ratings at the right of the heavy lines are for type AFS only. (With anti-friction bearings, and heat-treated steel gears.)

Net Capacities (Cubic Feet of Free Air per Minute)

Low Pressure Range—1 to 3 Pounds

Blower Size No.	Diam. Pipe Open	R.P.M.	1 Lb. Cu. Ft.	1 Lb. H.P.	2 Lbs. Cu. Ft.	2 Lbs. H.P.	3 Lbs. Cu. Ft.	3 Lbs. H.P.
24	1½	860	15	0.2	12	0.3	...	....
		1160	24	0.2	21	0.4	...	....
		1750	40	0.3	36	0.6	...	....
36	2½	860	62	0.5	52	1.0	45	1.5
		1160	92	0.7	82	1.3	75	2.0
47	2½	690	80	0.7	70	1.2	60	1.9
		860	108	0.8	96	1.5	86	2.4
		1160	150	1.0	145	2.0	135	3.0
59	3	690	178	1.2	160	2.3	150	3.3
		860	230	1.5	215	2.8	200	4.2
615	4	575	330	2.0	305	3.8	285	5.7
		690	405	2.3	380	4.6	365	7.0
717	5	490	480	2.8	450	5.6	425	8.5
		575	570	3.2	540	6.5	515	9.7
		690	700	4.0	670	8.0	650	12.0

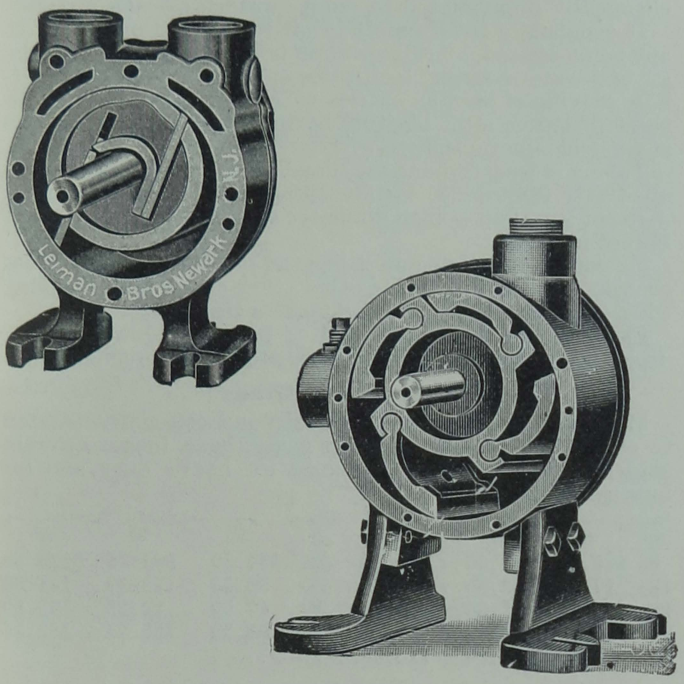
Medium Pressure Range—1 to 5 Pounds

Blower Size No.	Diam. Pipe Open	R.P.M.	1 Lb. Cu. Ft.	1 Lb. H.P	2 Lbs. Cu. Ft.	2 Lbs. H.P.	3 Lbs. Cu. Ft.	3 Lbs. H.P.	4 Lbs. Cu. Ft.	4 Lbs. H.P.	5 Lbs. Cu. Ft.	5 Lbs. H.P.
22	1	1160	12	0.1	10	0.2	8	0.3	...	...	...	....
		1750	21	0.2	18	0.3	16	0.5	...	...	...	....
33	2	860	38	0.3	33	0.6	28	0.9	24	1.2	20	1.5
		1160	56	0.4	50	0.9	45	1.3	41	1.5	38	2.0
44	2	860	60	0.5	53	0.9	47	1.3	43	1.7	40	2.0
		1160	86	0.6	80	1.2	75	1.6	70	2.2	65	2.8
55	2½	690	93	0.7	85	1.2	80	1.8	72	2.5	68	3.0
		860	122	0.8	113	1.5	107	2.3	100	3.0	96	3.9
67	3	575	165	1.0	154	2.0	145	3.0	135	4.0	130	4.9
		690	200	1.2	190	2.4	182	3.5	175	4.6	170	5.7
610	3	575	215	1.4	200	2.6	190	3.9	180	5.0	170	6.3
		690	270	1.5	255	3.1	245	4.6	235	6.1	225	7.5
710	4	575	335	2.0	315	4.0	300	6.0	290	8.0	276	10.0
		690	415	2.3	395	4.6	377	7.0	364	9.3	350	11.6

High Pressure Range—1 to 7 Pounds

Blower Size No.	Diam. Pipe Open	R.P.M.	1 Lb. Cu. Ft.	1 Lb. H.P.	2 Lbs. Cu. Ft.	2 Lbs. H.P.	3 Lbs. Cu. Ft.	3 Lbs. H.P.	4 Lbs. Cu. Ft.	4 Lbs. H.P.	5 Lbs. Cu. Ft.	5 Lbs. H.P.	6 Lbs. Cu. Ft.	6 Lbs. H.P.	7 Lbs. Cu. Ft.	7 Lbs. H.P.
315	¾	860	15	0.2	13	0.3	11	0.4	10	0.5	8	0.6	...	...	...	....
		1160	22	0.2	20	0.4	18	0.6	16	0.7	14	0.8	13	1.0	12	1.2
42	1½	860	42	0.3	37	0.6	34	0.9	31	1.2	28	1.5	26	1.7	24	2.0
		1160	60	0.4	55	0.9	52	1.2	49	1.5	45	2.0	44	2.4	42	2.8
53	2½	690	74	0.5	68	1.0	62	1.4	58	1.9	54	2.4	50	2.9	48	3.3
		860	94	0.7	90	1.3	84	2.0	80	2.5	76	3.0	74	3.7	70	4.5
65	3	690	135	0.9	125	1.6	120	2.4	115	3.2	110	4.0	105	4.8	100	5.6
		750	148	0.9	141	1.8	135	2.7	130	3.5	125	4.3	120	5.1	115	6.0
76	3	575	200	1.2	190	2.3	180	3.4	171	4.6	165	5.8	160	6.9	155	8.0
		690	245	1.4	235	2.8	225	4.2	218	5.5	211	7.0	205	8.5	200	10.0

Leiman Bros. Rotary Pressure Blowers, Vacuum and Gas Pumps


Leiman Bros Newark N.J.

For use with all gas and oil appliances, sand blasts, fuel oil burners, paper feeders, bottle fillers, vacuum cleaning plants and wherever air at pressure or a vacuum is required. For pumping gas from gas mains and wells and maintaining a non-fluctuating pressure.

For pressure up to 10 pounds or 20 inches vacuum, mercury, the wings are curved making it possible for them to take up their own wear. Wings are hinged to piston and are removable and interchangeable. For pressures up to 25 pounds or 29 inches vacuum, mercury, the wings are flat, offset at an angle which, with the patented wing compensator, prevents sticking or chattering of the wings.

For Pressure up to 5 Lbs., Vacuum up to 20 Inches and Gas Pressure up to 5 Lbs.

Pump Size	Cubic Feet per Minute	Speed R.P.M.	Single Tight Pulley Inches	Inlet and Outlet Threaded Inches	Approx. Floor Space Inches
A	6	600	10	½	7x9
B	10	600	10	¾	8x9
B-3	16	600	10	¾	8x10
C	18	400	12	1	9x12
C-6	37	400	12	1	9x15
D	35	300	12	1¼	12x15
E	60	250	15	1½	15x25
F	78	200	18	2	17x29
F-8	105	200	30	2	18x31
G	162	200	30	2½	21x33
H	338	200	30	4	23x48
†25	1.2	1750	*2½	¼	3x6
†26–1	2.4	1750	*5	⅜	4x7
†26–1½	3.6	1750	*5	⅜	4x8
†26–3	7.2	1750	*5	⅜	4x9

For Pressure up to 25 Lbs., Vacuum up to 29 Inches

Pump Size	Cubic Feet per Minute	Speed R.P.M.	Single Tight Pulley Inches	Inlet and Outlet Threaded Inches	Approx. Floor Space Inches
27	3.3	600	10	½	6x11
28–2	6.2	600	10	¾	7x11
28–3	9.2	600	10	¾	7x12
28–4	12.3	600	10	1	7x13
29–3	10.2	400	12	1	9x13
29–6	20.4	400	12	1	9x17
**33–8	61.	200	30	2	19x30

*Grooved pulley.

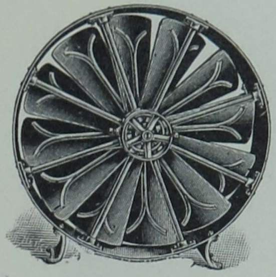
**Size 33–8 is water cooled.

†Pressure to 25 pounds or 27-inch vacuum.

Automatic continuous feed oiling system is recommended in place of oil cups.

Prices and complete specifications upon application.

Champion Disc Wheels and Mine Fans



This fan is especially constructed for ventilating, and can be used for factories, laundries, restaurants, offensive closet ventilation; in fact, any place where a supply of fresh air is desired.

The Champion Disc Wheel and Mine Fan is built strongly. Its blades are made of special rolled steel, mechanically fitted into a grooved hub, where they are securely fastened. They run entirely noiseless and are guaranteed to give perfect satisfaction.

The bearings are regularly furnished with Plain Ring Oiling Bearing of genuine Babbitt, but can be supplied with Self-aligning Ball Bearings if specially ordered, and the shaft is made from hammered steel, extra length, so that pulleys can be placed on either side, preventing cross belts.

Diameter of Wheel In.	With Plain Bearings Each	With Ball Bearings Each	Diameter of Pulley In.	Face of Pulley In.	Weight Each Pounds
18	**$26.50**	**$54.00**	4	2	90
24	**32.00**	**62.00**	4	2	115
30	**42.50**	**72.00**	6	2	160
36	**55.00**	**88.00**	6	2	180
42	**100.00**	**125.00**	8	3½	350
48	**120.00**	**135.00**	9	4	405
54	**140.00**	**175.00**	9	4	425
60	**160.00**	**235.00**	10	5	515
72	**210.00**	**300.00**	12	5½	650
84	**300.00**	**350.00**	14	6	750

Tables of Speeds, Capacities, Etc. of Champion Disc Wheels and Mine Fans for Mine Ventilation

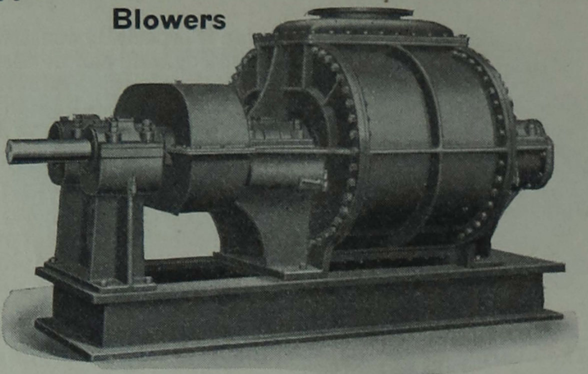
Fan	¼-Inch Pressure			⅜-Inch Pressure			½-Inch Pressure		
In.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.
18	1000	625	.20	2100	725	.45	3300	825	.75
24	2000	560	.25	3500	650	.50	4700	775	1.00
30	3500	500	.35	4500	600	.75	6000	725	1.50
36	6000	450	.50	7500	560	1.00	9200	680	2.00
42	9000	400	1.00	10750	485	1.75	12350	570	2.75
48	12200	350	1.25	14700	435	2.25	16700	500	3.50
54	15500	305	1.50	18500	380	2.75	21100	440	4.50
60	18500	280	2.00	22500	340	3.50	25700	400	5.50
72	25800	230	2.50	31000	285	5.00	36400	330	8.00
84	35500	200	4.00	43500	245	7.00	49500	275	10.75

	⅝-Inch Pressure			¾-Inch Pressure		
	C.F.M.	R.P.M.	H.P.	C.F.M.	R.P.M.	H.P.
18	4500	925	1.00	5600	1050	1.75
24	5200	875	1.25	6500	925	2.00
30	7900	825	2.00	9900	875	2.50
36	10300	730	2.50	12900	790	3.75
42	15000	640	4.00	16500	695	5.25
48	18700	560	5.25	21000	615	7.00
54	24000	495	6.50	26800	535	8.75
60	29500	450	8.00	33800	485	11.00
72	40500	375	11.25	46000	410	15.25
84	54000	315	15.50	61500	340	21.00

	1-Inch Pressure			1½-Inch Pressure		
18	6800	1125	2.25	8100	1400	4.00
24	8700	1025	3.00	10500	1300	5.00
30	11900	975	3.75	13900	1200	8.00
36	14700	910	5.75	16000	1120	11.50
42	18500	700	8.00	22300	975	14.50
48	24200	700	10.75	29000	860	19.00
54	30500	620	13.75	37100	750	25.00
60	38000	560	16.00	45500	685	32.00
72	53500	465	24.00	64000	565	44.00
84	70500	400	33.00	85500	485	62.00

If resistance is less than has been assumed in the above table, the pressure will be lower and the volume of air delivered will be more and horsepower less.

Type HD Roots-Connersville Heavy Duty Blowers



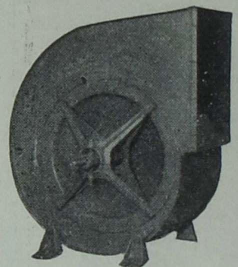
Involute impeller design for applications requiring delivery of air under pressure or vacuum up to 10 pounds gauge. For pressure service, connection is made to outlet; for suction, connection is made to inlet.

Right-hand drive is standard. Shafts extend beyond gears and are supported by a double bearing, all mounted on a cast iron baseplate. Standard semi-steel epicycloidal gears and herringbone gears are used. Has roller or renewable split sleeve babbitt-lined bearings.

Should be operated at top discharge; at lower pressures, bottom discharge may be used under certain conditions.

Prices upon application.

ILG Type BW Universal Belted Blowers



Construction is similar to that of the direct connected unit; sides are cast iron, and the bearing bracket is recessed in the sheet steel bowl.

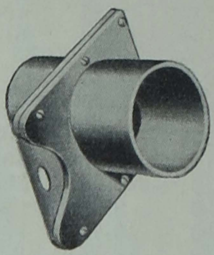
Pulley and wheel are overhung in the shaft which runs on oversized babbitted sleeve type bearings.

No bearing is used in the inlet.

Capacities of double width blowers are double those of single width blowers.

Size No.	Outlet Area Sq. Ft.	Single Width, Single Inlet		Double Width, Double Inlet	
		R.P.M.	Ship. Wt. Lbs.	R.P.M.	Ship. Wt. Lbs.
BW25	.8	1800	175	...	....
BW30	1.2	1500	225	...	....
BW35	1.7	1300	295	...	....
BW40	2.3	1100	425	...	....
BW45	3.0	1000	550	...	....
BW50	3.7	850	725	850	925
BW55	4.5	700	850	700	1075
BW60	5.4	600	1025	600	1275
BW70	7.5	500	1400	500	1825
BW80	9.9	400	1800	400	2375
BW90	12.6	350	2400	350	3200

Champion Standard Blast Gates



Size In.	Wt. Lbs.	Each	Size In.	Wt. Lbs.	Each	Size In.	Wt. Lbs.	Each
2	2	$.80	5	10	$1.90	12	55	$8.00
2½	4	1.10	6	12	2.40	14	60	10.00
3	5	1.30	7	15	3.00	16	80	12.50
3½	6	1.50	8	25	3.30	18	100	16.00
4	7	1.60	9	30	4.50	20	150	20.00
4½	9	1.80	10	40	4.80	24	200	25.00

Flexipipe

Flexipipe is a flexible air duct made of strong material chemically impregnated to render waterproof and airtight.

It conducts a fresh supply of air from a fan or blower to any point desired, ventilates blind headings, such as tunnels, air and water courses, facilitates sinking of shafts and permits driving of parallel entries without crosscuts. It eliminates lost time after blasting by instantly replacing smoke and gas-laden atmosphere with fresh air.

Tubing is hung from an overhead wire by metal hooks supplied with the tubing. Can be suspended from any ordinary wire not less than ⅛-inch diameter attached to roof at about 15-foot intervals.

To couple together any 2 lengths of Flexipipe, compress one coupling and insert into other. The compressed coupling when released will expand and make a tight joint.

Flexipipe must be used with a pressure blower, and a direct-connected motor blower outfit is recommended.

Heavy Duty Grade

Made of extremely tough fabric and especially treated to render it highly resistant to gases, heat, fungus growth, acid and mine waters. Designed for heavy duty and for long service.

Diam. In.	Length, Feet 25	50	100	Diam. In.	Length, Feet 25	50	100
8	$14.25	$26.00	$49.25	22	$34.50	$64.75	$125.50
12	17.50	32.50	62.50	24	38.50	72.75	141.00
16	21.75	41.00	78.75	30	47.50	87.25	165.50
18	26.50	49.00	95.00	36	63.00	105.75	182.75
20	30.50	57.00	110.00	..	.....	......	......

Jute Grade

Recommended where tubing of high tensile strength is needed. It receives same treatment as heavy duty grade and is equally protected against deterioration.

8	$11.50	$20.25	$38.25	22	$25.75	$47.25	$90.75
12	14.50	25.00	47.50	24	29.25	54.00	104.25
16	17.00	30.50	57.25	30	35.50	63.00	119.25
18	19.50	35.25	67.75	36	49.50	82.25	143.75
20	22.25	40.50	77.50	..	.....	.....	......

Light Duty Grade

Designed for use in mines or tunnels where a temporary tubing is required or where acid water, fungus growth, and other severe conditions are not encountered.

8	$9.25	$15.50	$27.50	22	$21.75	$39.00	$70.00
12	11.75	19.00	34.50	24	23.75	43.00	77.00
16	15.50	27.00	49.00	30	33.75	55.00	112.75
18	17.50	31.00	56.00	36	47.00	77.50	135.00
20	19.50	35.00	63.00	..	.....	.....	......

For blasting sections equipped with special snap hooks, add 4 cents per foot to above prices.

Couplings and suspension hooks included in sales prices.

Prices of large and special diameters and lengths of Flexipipe with or without couplings, and Flexipipe fabric for patching furnished upon request.

Flexipipe Accessories

Heavy Duty Grade

Description	Diameter, Inches 8	12	16	20	24
45° L's	$5.00	$5.50	$6.75	$8.25	$9.50
90° L's	6.00	7.50	8.50	9.25	11.00
T's	8.50	9.75	11.00	12.50	14.00
Y's	8.50	10.25	13.25	16.25	19.00
10-In. Fan Connections	7.50	9.00	11.00	12.50	14.00
Suspension Collars	1.50	1.75	2.00	2.25	2.50
Size Reducer		in.	12–8	16–8	16–12
Reducers			$6.50	9.00	7.50

Jute and Light Duty Grades

Description	8	12	16	20	24
45° L's	$4.00	$4.50	$5.50	$6.50	$7.50
90° L's	5.00	5.75	7.00	8.50	10.00
T's	6.75	8.00	9.00	10.50	11.75
Y's	6.75	8.50	11.00	13.00	15.00
10-In. Fan Connections	6.00	7.50	8.75	11.25	13.75
Suspension Collars	1.50	1.75	2.00	2.25	2.50
Size Reducer		in.	12–8	16–8	16–12
Reducers			$5.25	7.50	6.00

Cement for patching, $1.00 per pint.

Prices on Rustproof Demountable Couplings (used for connecting up odd lengths) furnished upon request.

Galvanized Steel Air Pipe

Slip Joints with Lugs

	Per Foot				
	Size Inches				
Gage	5	6	8	10	12
28	$.16	$.20	$.24	$.29	$.33
26	.19	.25	.27	.33	.35
24	.27	.29	.33	.41	.47
22	.31	.36	.48	.59	.75
20	.35	.41	.53	.68	.85

Elbows, Tees, Reducers, Y's and Blower Connections can be furnished to specifications.

Flexipipe Accessories

For Heavy Duty Grade

	8-In.	12-In.	16-In.	20-In.	24-In.
45° L's	$5.00	$5.50	$6.75	$8.25	$9.50
90° L's	6.00	7.50	8.50	9.50	11.00
T's	8.50	9.75	11.00	12.50	14.00
Y's	8.50	10.25	13.25	16.25	19.00
10-Ft. Fan Connections	7.50	9.00	11.00	12.50	14.00
Suspension Collars	1.50	1.75	2.00	2.25	2.50

Reducers: 12 to 8-inch, $6.50; 16 to 8-inch, $9.00; 16 to 12-inch, $7.50. Cement for patching, $1.00 per pint.

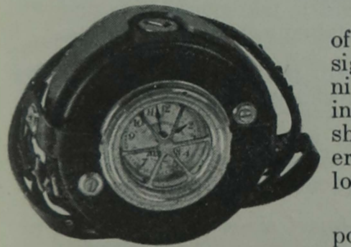
For Jute and Light Duty Grades

45° L's	$4.00	$4.50	$5.50	$6.50	$7.50
90° L's	5.00	5.75	7.00	8.50	10.00
T's	6.75	8.00	9.00	10.50	11.75
Y's	6.75	8.50	11.00	13.00	15.00
10-Ft. Fan Connections	6.00	7.50	8.75	11.25	13.75
Suspension Collars	1.50	1.75	2.00	2.25	2.50

Reducers: 12 to 8-inch, $5.25; 16 to 8-inch, $7.50; 16 to 12-inch, $6.00. Cement for patching, $1.00 per pint.

Detex Newman Portable Watchman's Clocks

Approved by National Board of Fire Underwriters and All Mutuals



A simple mechanical device of durable construction, designed to provide a check on night watchmen in the producing of an indisputable record showing if he is or is not properly performing his duty, and lowers insurance rates.

This system consists of a portable clock which is carried in a leather pouch by supporting straps over the watchman's shoulder, also registering keys located at important inspection points on the watchman's route. Each key records a different number on the paper dial in the clock and the male die (or type) is on the key.

The registering key is attached to a rust-proof chain, which in turn is fastened securely to a cast iron station box. The box is screwed to the wall and metallically sealed, thus preventing removal without detection.

The Detex Newman Watchclock is tamper-proof and constructed of rust-proof, non-corrosive materials.

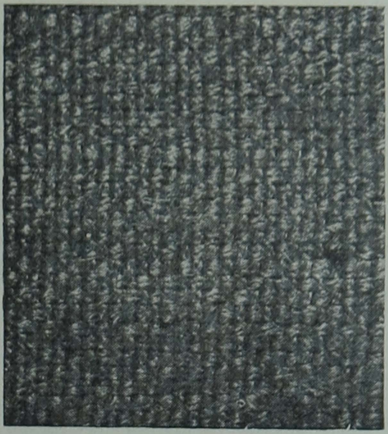
A complete outfit comprises the watchclock, leather carrying pouch with shoulder strap, station registering keys and chain, station boxes, metal seals for sealing the station boxes, and one year's supply of dials.

There is only one size clock, which is of 40-station capacity. As many keys as required can be purchased.

Price, Watchclock, with Leather Carrying Case and One Year's Supply of Dials....each	$60.00
Price, Standard Station Box, with Recording Key and Chain, and Metal Seals....each	2.25

Lock Box and Flush Type Stations furnished at slight extra cost.

U-W Brattice Cloth



No. 9626

A single warp, medium weight cloth. Non-inflammable, won't burn. A competitive grade.

In 36, 48, 60, 72, 84 and 96-inch widths; rolls of approximately 55 lineal yards.

No. 5071

A medium heavy single warp cloth. Made from long fibre jute of high quality to insure longer life, strength and greater safety.

In 36, 48, 60, 72, 84 and 96-inch widths; rolls of approximately 55 lineal yards.

No. 8372

The heaviest single warp obtainable. For use where service conditions are severe. Closely woven; less air leaks.

In 36, 48, 60, 72, 84 and 96-inch widths; rolls of approximately 55 lineal yards.

No. 2098

An extra heavy double yarn warp for extreme gas and air conditions. Maximum strength and minimum leakage. A greater number of threads per inch makes this a tight and heavy cloth.

In 36, 48, 60, 72, 84 and 96-inch widths; rolls of approximately 55 lineal yards.

No. 20 Special

An extra heavy, closely woven white fireproofed cotton duck.

Furnished in 36, 48, 60 and 72-inch widths without seams; in rolls of 50 and 100 lineal yards.

Air-Tight and Waterproof Jute

Jutate and Juten Brands

This air-tight and waterproof jute brattice is made by treating jute cloth with a black compound which eliminates air seepage and renders the cloth waterproof. Not non-inflammable but burns slowly if held against a flame.

Jutate brand is made with a medium weight jute cloth as a base, whereas Juten brand is made with a heavy jute cloth as a base.

Furnished in 36 and 42-inch widths without seams and wider than 42 inches with seams.

Blacote Air-Tight and Waterproof Cotton Duck

Made by treating a medium weight cotton duck with a black compound. Slow burning when held against a flame.

Furnished seamless in 36, 48, 60 and 72-inch widths; rolls of approximately 100 yards each.

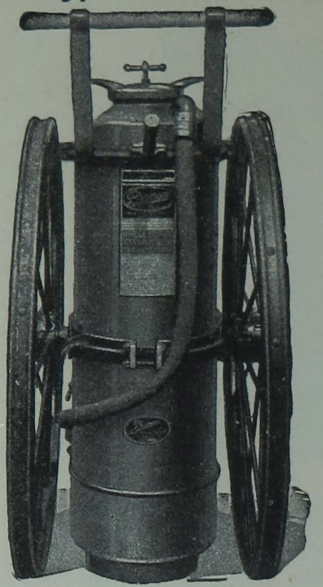
Old Sail Brattice

Made of heavy canvas salvaged from sails taken from ocean fishing schooners. Not treated in any way.

Furnished in multiples of 20-inch widths.

Prices Upon Application

Type PD2PN Phomene 40-Gallon Foam Engines



This portable extinguisher should be installed wherever quantities of materials of an oily or highly inflammable character are manufactured, used, or stored.

Consists of an outer tank and an inner removable container. The former is sheet-steel, with the seam riveted and welded, and a drawn steel bottom and dome, brazed to the tank cylinder. Entire tank coated by hot, dipped galvanizing. Tested to 400 pounds. Red enamel finish.

The inner removable container is cold-rolled copper, coated inside and out with a corrosion-resisting alloy of lead and tin. A manually-operated stopple closes container to prevent splashing.

Operate by unscrewing valve and lowering to ground. Ejects a tough, heavy foam blanket that clings to walls or floats on surface of burning oil. The foam is non-damaging and reignition-proof. It puts out fire and keeps it out. Shut-off nozzle stops flow of foam as desired. Operates best between 55° F. and 90° F.

Steel, rust-proof wheels, 50 inches. Space occupied, 50x30x63 inches. Tread, 26 inches. Width over all, 30 inches. Height, 63 inches. The chemical hose is 50 feet long and 1¼ inches in diameter.

Weight, empty, 460 pounds; charged, 810 pounds.

Inspected and labelled by the Underwriters' Laboratories and approved by the Factory Mutual Laboratories.

Type PD2PN............................each **$400.00**

Pyrene Fastfome 2½-Gallon Fire Extinguishers

Foam Type

The Fastfome blankets fire—particularly fires in oil, gasoline, naphtha, tar, wax, grease, shellac and flammable solvents.

It releases 22 gallons of tough fire-killing foam. The foam spreads rapidly over burning surface, cutting off supply of oxygen. Once extinguished, fire cannot reignite as the foam blanket is still there.

Labeled by The Underwriters' Laboratories and approved by Factory Mutuals and U.S. Bureau of Marine Inspection and Navigation.

No. **PX13**, Polished Copper	ea.	**$18.00**
No. **PX12**, Copper, N. P.	ea.	**20.00**
No. **PX14**, Copper, Chromium-Plated	ea.	**21.00**
No. **PXR1**, Recharge	ea.	**1.15**

Pyrene Essanay 2½-Gallon Fire Extinguishers

Soda and Acid Type

The Essanay will extinguish incipient fires in free-burning materials where the cooling and quenching effect of water is of first importance. It throws a stream 40 feet in any direction. It should be protected against frost.

Made of cold-rolled copper. The interior is completely coated with a lead-alloy.

Labeled by Underwriters' Laboratories and approved by Associated Factory Mutuals and U. S. Bureau of Marine Investigation and Navigation.

No. SX13, Polished Copper	ea.	**$15.00**
No. SX12, Copper, N. P.	ea.	**17.00**
No. SX14, Copper, Chromium-Plated	ea.	**18.00**
No. SXR1, Recharge	ea.	**.40**

Pyrene One-Gallon Pressure Type Fire Extinguishers

Especially adapted for large industrial use, protection of buses, filling stations, etc., and all electrical equipment needing greater capacity. Extinguisher of one-gallon capacity consists of top and bottom casting of high pressure brass to which is fastened inner and outer shell of heavy gauge seamless drawn tubing forming two chambers. Inner contains air pressure, outer, Pyrene Fire Extinguishing Liquid. Chambers sealed tightly against each other. When operating valve wheel is turned, air pressure enters liquid chamber expelling continuous stream of liquid through flexible rubber covered metal hose.

Pump built into extinguisher used to replace air pressure. Air valve for use with service line also provided. Open face pressure gauge attached to top casting indicates correct air chamber pressure. Inspection glass to observe liquid level on outer shell. Normal level, center.

Carrying strap provided. Leaves both hands free to operate extinguisher and control stream over a 30 to 40-foot range. Quarter turn of valve wheel stops or starts flow of liquid. Wall or vehicle bracket can also be provided. One-gallon pressure type Pyrene Fire Extinguisher inspected, labelled by Underwriters' Laboratories and approved by Associated Factory Mutual Laboratories.

Weight of extinguisher, filled ready for use, 34 lbs.; packed 1 to a carton, shipping weight, 39½ lbs.

Height over all, 23 inches; diameter of tank, 6 inches.

C-43	Polished Copper	each	**$70.00**
C-42	Copper, Buffed Nickel	each	**73.00**
C-44	Copper, Chromium Plated	each	**74.00**

Refills

CR-4	1-Gallon Can	each	**$5.40**
CR-5	20-Gallon Drum	each	**100.00**
CR-6	50-Gallon Drum	each	**250.00**

Pyrene Fire Extinguishers

Pyrene Extinguishers are safest for use on electrical fires of all kinds and for fires starting in oil, paint or other highly inflammable materials. The liquid is non-conductive and will not injure electrical equipment.

The contents will not freeze at 50°F. below zero. Needs no recharging until used.

The 1-pint size is made especially for the modern car. It contains enough liquid to extinguish any incipient automobile fire.

The 1 and 1½-quart sizes (not pint size) are labeled by the Underwriters' Laboratories.

*Also C21C Truck Bracket, C21M Motorcycle Type and C21P Airplane Type, same price.

No.	Each	Description	Capacity
C-11	$10.00	Brass, with Wall Bracket	1-Pt.
C-11A	10.50	Brass, with Auto Bracket	1-Pt.
C-14	12.00	Chromium-Plated, with Wall Bracket	1-Pt.
C-14A	12.50	Chromium-Plated, with Auto Bracket	1-Pt.
*C-21	14.00	Brass, with Bracket	1-Qt.
C-22	15.50	Nickel-Plated, with Bracket	1-Qt.
C-24	16.00	Chromium-Plated, with Bracket	1-Qt.
C-25	14.00	Painted, with Bracket	1-Qt.
C-31	17.00	Brass, with Bracket	1½-Qt.
C-32	18.50	Nickel-Plated, Bracket	1½-Qt.
C-34	19.00	Chromium-Plated, Bracket	1½-Qt.
C-35	17.00	Painted, with Bracket	1½-Qt.

Refills

No.	CR-1	CR-2	CR-3
Per Can	$.75	1.50	2.25
Capacity of Can	1-Pint	1-Quart	1½-Quart

No. T-15 Accurate 5-Gallon Pump Tanks

ACCURATE
FIVE GALLON
PUMP TANK
FIRE

This extinguisher throws a steady, continuous 40-foot stream. Has double acting pump of heavy brass. Heavily lined to prevent rusting. Approved by the Underwriters' Laboratories, the U. S. Bureau of Marine Inspection and Navigation, and Associated Factory Mutual Laboratories. Where in danger of freezing, the extinguisher should be charged with a solution of Accurate Anti-Freeze and water.

Packed one in carton; weight, 16½ pounds.

No. **T-15**.....................each **$22.00**

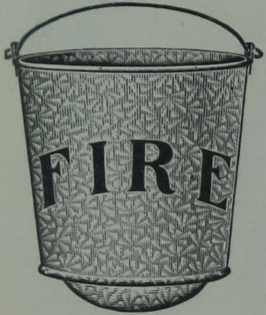
Non-Freeze Charge

For 10° above zero use 10 pounds; for 10° below zero use 15 pounds; for 40° below zero use 20 pounds.

TR1, Anti-Freeze Charge, 20 Lbs... **$3.00**

Fire Pails

Round Bottom



Galvanized

Galvanized, stencilled FIRE in large red letters.

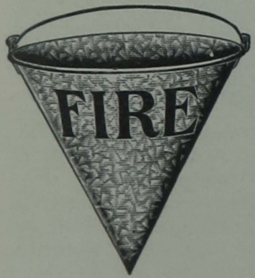
Price, 12 Quarts...per doz. **$12.00**
Price, 14 Quarts...per doz. **13.00**

Painted

Painted red, stencilled FIRE in large white letters.

Price, 12 Quarts...per doz. **$17.50**
Price, 14 Quarts...per doz. **18.50**

Galvanized Conical Fire Pails



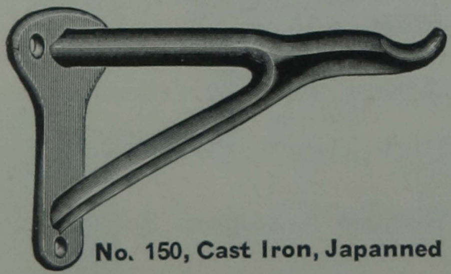
Made of heavy steel, galvanized outside and inside.

Since pails of this shape must be hung up or placed in a special rack there is less chance of their being used for other purposes.

Packed 12 in a bundle.

Cap. Qts.	Weight Pounds per Bundle	Price per Doz.
12	36	**$23.00**
14	45	**25.00**

Fire Pail Hooks



No. 150, Cast Iron, Japanned

Packed, 12 in a box, without screws.

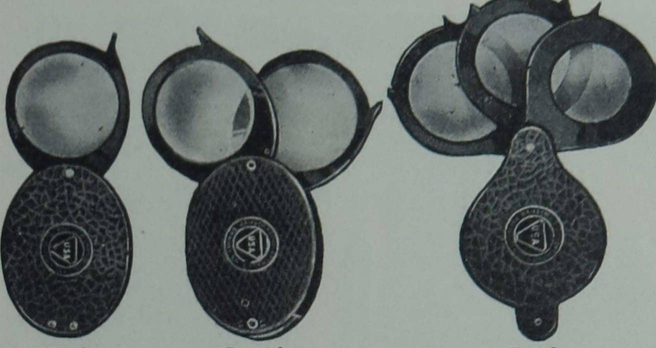
No.	Length Inches	Base Inches	For Screw No.	Price per Dozen
150	7⅜	4½x2	12	......

No. 150½, Cast Iron, Brown Lacquer

Packed, 12 in a box, with screws.

150½	7⅜	4½x2	12	......

Bausch & Lomb Folding Pocket Magnifiers



Single **Double** **Triple**

These small pocket magnifiers are made with single, double or triple lenses in hard rubber vulcanite mountings.

The double lens style gives a choice of 3 magnifications and the triple gives 7—depending upon the combinations of lenses used.

The 30-mm. single lens model in ivory finish is for use in hospitals, etc.

No....................	**81–23–50**	**81–23–95**	**81–23–99**
Each....................	**$.90**	**1.50**	**2.00**
Shape....................	Oval	Oval	Bellows
Diameter.........mm.	20	15 and 20	12, 15 and 18
Magnification X......	5.0	5.0 to 10	6.0 to 20

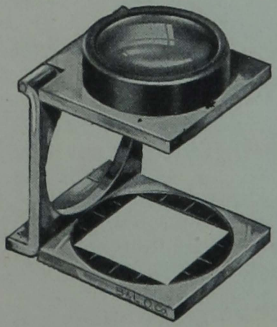
No. 31-63-01 Bausch & Lomb Tripod Magnifiers

Used for elementary biological work and dissections. Large clear field. The lens mounting screws up and down for focusing.

Diameter lens, 25 mm.; power, 7.5X.

No. **31–63–01**..............each **$.75**

No. 81-34-45 Bausch & Lomb Linen Testers



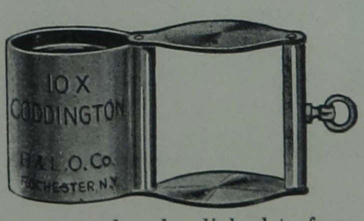
A handy pocket glass used by textile buyers to count the threads in a piece of fabric. Nickel standard folds compactly to vest pocket size. Also ideal for printers and engravers.

Supplied with graduated base and attractive case.

Diameter of lens, 28 mm.; power, 5X.

No. **81–34–45**.........each **$4.50**

No. 31-61-34 Bausch & Lomb Coddington Magnifiers



This magnifier gives a good definition and a wide field. Made of a single piece of glass of cylindrical shape with a deep groove cut in the center and blackened to act as a diaphragm. Ends of the cylindrical-shaped glass are ground and polished to form lens surfaces.

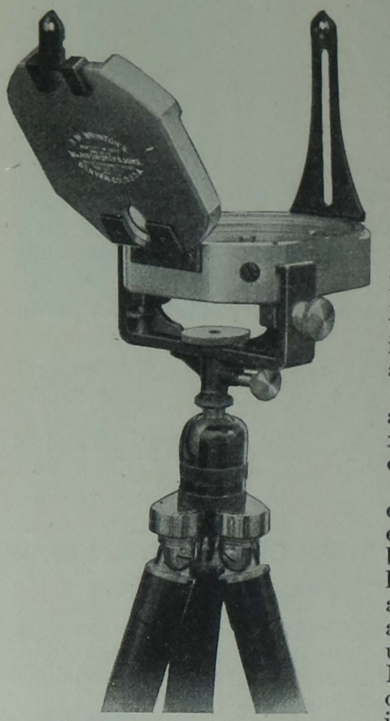
No....................	**31-61-27**	**31-61-30**	**31-61-34**	**31-61-40**
Each....................	**$3.75**	**3.75**	**3.75**	**3.75**
Focus.............in.	1½	1	¾	½
Power....................	7X	10X	14X	20X

S. & A. Gigant 25× Pencil Microscopes
Pencil Type with Clip

Twenty-five power. Ideal for minute examination of paint surfaces, magnifying and examining textiles, photos, metals, insects, abrasive products of all kinds, ores, etc. Looks like a fountain-pen.

Each.. **$1.25**

Brunton Patent Pocket Transits



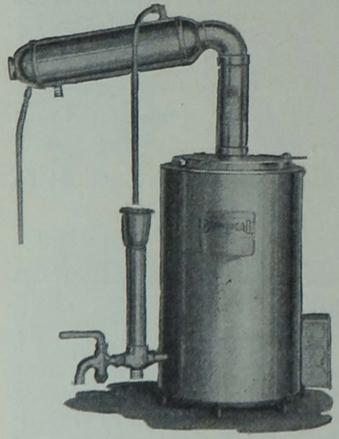
For preliminary surveys on the surface or underground, for reconnaissance and for geological field work, this is a most convenient and compact instrument for the civil mining and military engineer, mine manager and geologist. May be used on a tripod as shown or as a hand instrument. It combines the best features of a sight or prismatic compass, hand level and clinometer.

The sights fold into the aluminum case, 2¾x2¾x1¼ inches. Weight, 8 ounces.

Has improved sight apertures with enlarged opening in mirror bisected by a hair line, double level vials on vernier and a per cent grade scale in addition to degree graduations on clinometer. Magnetic variation is set off by means of a screw in case.

Price, Instrument Only......................	each	**$30.00**
" Ball and Socket Attachment Head Adapting Instrument for Use on Tripod...............	each	**6.00**
Price, Tubular Extension Tripod..............	"	**8.00**
" Leather Case for Instrument Only, with Belt Loop	"	**2.50**
" " " " " " Sling Strap	"	**3.00**
" " " with Sling Strap to Take Instrument, Attachment Head and Tripod ...	"	**6.00**

No. EG-1 Barnstead Water Stills



Provides chemically pure distilled water for not only laboratory use but for use in storage battery locomotives, miners' cap lamps, batteries in motor trucks or in electric hoists.

Easy to operate.

A 1-gallon per hour, electrically-operated still operates on 110 volts, 24 amps. or 220 volts, 12 amps. K.w. rating is 2.6.

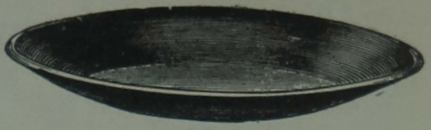
Other sizes available.

No. **EG-1**..... each **$66.00**

Placer Mining Books

ABC of Practical Placer Mining, by A. Sourdough.	each	**$1.00**
Prospecting and Operating Small Gold Placers, by William F. Boericke.........................	each	**1.50**

Gold Washing Pans



No. 149-E Aluminum

Diameter........................	inches	**6**	**12**	**16**
Depth........................	inches	1¼	2	2½
No. **149-E**........................	each	**$1.00**	**1.25**	**1.75**

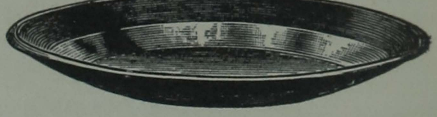
No. 149-F Polished Steel

Diameter........................	inches	**6**	**12**	**16**
Depth........................	inches	1¼	2	2½
No. **149-F**........................	each	**$.40**	**.45**	**.60**

No. 149-G Copper

Diameter........................	inches	**6**	**12**	**16**
Depth........................	inches	1¼	2	2½
No. **149-G**........................	each	**$1.25**	**1.50**	**2.75**

No. 149-H Steel and Copper

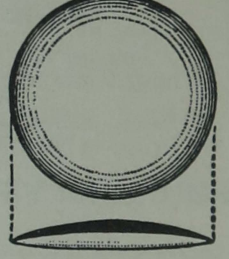


Made of steel with copper bottom.

Diameter, 16 inches; depth, 2½ inches.

No. **149-H**.. each **$4.50**

No. 149J Richards Vanning Plaques

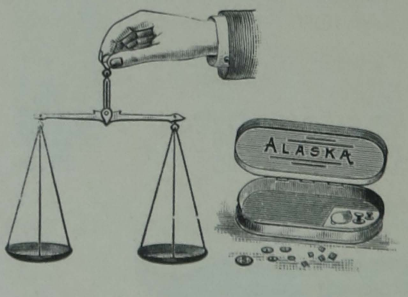


Made of enameled iron.

Diameter, 11 inches.

No. **149J**.. each **$1.75**

No. 355D Hand Gold Scales



Entire scale is of brass, including deep brass pans, hung with brass chains. Full set of accurate weights, including pennyweights and grains are furnished.

Put up in neat tin boxes, with oval ends, and enameled green with bronze stripes.

Capacity, 2 ounces; sensibility, ½ grain; diameter of pans, 3 inches.

Shipping weight, 3 pounds.

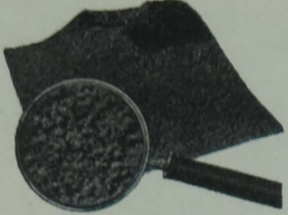
No. **355D**.. each **$6.00**

Rubber Amalgam Scrapers

Size, 6x6x½ inch.

Each.. **$.90**

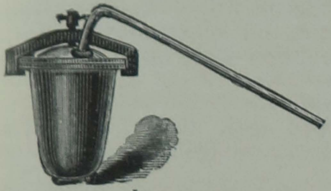
Bonanza Rubber Matting



A rubber sluice box lining approximately ⅛ inch thick. Both sides have an irregular corrugated (crepe) surface to catch the gold. Also used in launders in mills. Durable and easily cleaned by removing and washing out the gold.

In Rolls, 2x10 Ft.	per sq. ft.	**$.45**
Less Than Rolls in One or 2-Ft. Widths Only	per sq. ft.	**.50**

Retorts



Iron

Iron retorts are for mercury distillation, etc., movable cover fastened by screw clamp and milled smooth, making it tight fitting.

Capacity, ½, 1, 2, 4, 8 and 16 pints.

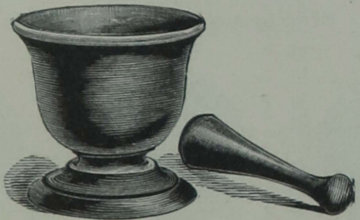
Nevada or Oval Type retorts, complete with iron delivery tube.

Capacity	pints	**3**	**4**	**5**	**6**	**10**
Holds Quicksilver	pounds	38	50	63	75	125
Weight	pounds	18	25	30	44	65

Copper retorts can also be furnished.

Prices upon application.

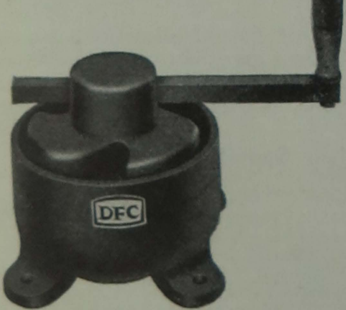
Iron Mortars



High form with pestle.

No.	Each	Cap. Qts.	Diam. In.	Wt., Lbs.
1A	**$.90**	¼	3¾	3
2A	**1.00**	½	5	5
3A	**1.50**	1	5½	7
4A	**2.00**	2	7	12
5A	**4.00**	4	8¼	17
6A	**6.00**	8	11	32
7A	**10.00**	12	12	46

No. 2196 Denver Buck Iron Crusher Mortars



For grinding and amalgamating.

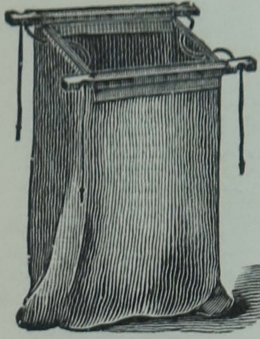
By the rotation of the muller, a large sample of ore may be ground.

May also be ground with quicksilver.

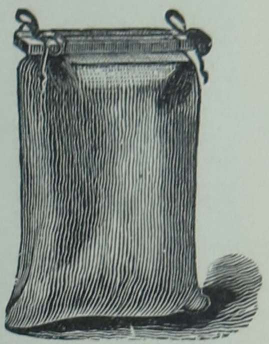
Diameter	in.	**6½**	**8½**
No. 2196	each	**$9.00**	**15.00**
Weight of Muller	lbs.	16	49
Total Weight	lbs.	30	76

Ore Sacks and Bags

Cotton Duck Sacks



Sack with Boss Fastener (Open)



Sack with Boss Fastener (Closed)

Furnished in any size desired. Size of sacks is based on size cut, before sewed, which makes all sizes finish about ½ inch less than specified size. All sacks are furnished with plain opening unless sack with Boss Fastener is specified. It only takes one-quarter the time to fill and tie sacks with Boss fasteners than it takes to fill the plain sack. This fastener will wear nearly twice as long as the plain sack.

Cotton Duck Grade No.		**11**	**10**	**9**	**8**
14½x24 In.	each	**$.31**	**$.35½**	**$.41½**	**$.45**
15½x28 In.	each	**.36**	**.41½**	**.45½**	**.52**
17 x24 In.	each	**.35½**	**.42**	.....	**.55½**
17½x28 In.	each	**.41½**	**.51½**	**.54**	**.61½**
18½x28 In.	each	**.44½**	**.54**	**.57½**	**.65½**

For sacks with Boss Fasteners add .$08 to above prices.

Specie or Sample Bags

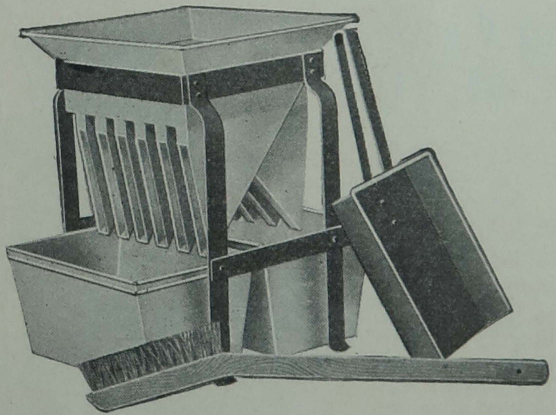
Eight-ounce duck with tie strings. Also made of light drill or any weight duck at proportionate prices.

Any size not listed made to order if desired.

No.	**0**	**1**	**2**	**3**	**4**	**5**
Per 100	**$9.50**	**15.00**	**20.00**	**25.00**	**54.00**	**52.00**
Size, in.	4x7	6x10	7x14	9x15	10x21	12x16

Made with draw strings at 25 per cent additional.

Ore Samplers



The construction of this device facilitates quick and even sampling.

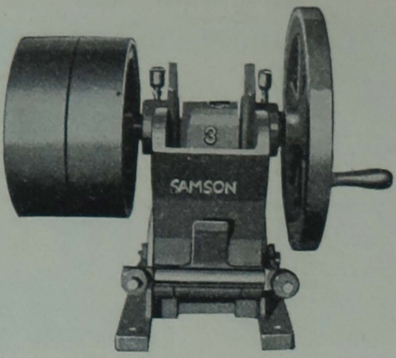
Sampler consists of hopper set in 4-legged support, scoop and 4 sampling pans and brush.

All parts can be easily cleaned.

Larger sizes than listed made to order; prices upon application.

Size	inches	**8x10**	**10x18**
Width Trays	"	¾	1
Price, Complete	each	**$25.00**	**$40.00**
" Pan Only	"	**1.75**	**2.25**
" Scoop Only	"	**1.50**	**2.50**
" Extra Brushes	"	**.50**	**.50**

No. 00 Samson Laboratory Crushers



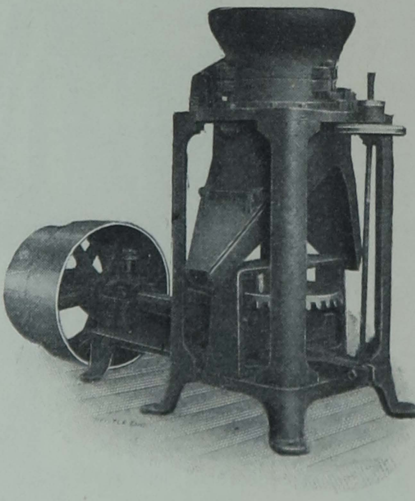
The Samson crushes anything from the hardest rock to the softest ore. It will not choke on sticky material, crushes fine to a uniform size and the forward and downward movement of the jaws accelerates discharge and prevents clogging.

Has few moving parts, unusual durability and great strength and power. It can be instantly opened without tools for cleaning by pulling down an eye bolt and dropping front journal. Stationary jaw plate may then be turned up, exposing both jaws and side plates for cleaning. Jaw plates are manganese steel.

It is simple, requires little power and can be operated either by hand or belt.

No.		**00**
Jaw Opening	inches	1½x4
Approximate Capacity per Hour, to ⅛-Inch	pounds	300
Power Required	h.p.	1
Speed	r.p.m.	500
Tight and Loose Pulleys	inches	12x3
Weight	pounds	300
Price, No. **00**	each	**$75.00**

No. 2 Improved Ore-sample Grinders



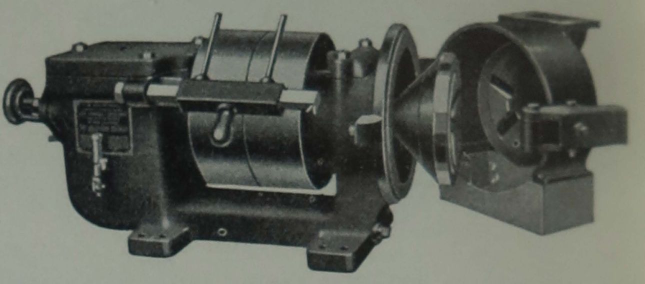
Designed for the purpose of simplifying and economizing the grinding of ore samples.

Simple in construction, compact and extremely durable, and is extensively used by the leading smelters and sampling works.

The hopper and grinding ring may be swung open and the cone lifted out and cleaned after the sample has been ground, and when the grinding ring and cone are worn they may be replaced by new ones without difficulty. The grinding parts are made of a hard composition and are durable.

Revolutions-Driving Shaft	per minute	150
No. 2	each	**$200.00**
Diameter of Pulleys	inches	18
Face of Pulleys	inches	6
Weight, Grinder	pounds	850
Weight, Cone and Ring	pounds	145
Weight, Bevel Gear and Pinion	pounds	50
Weight, Vertical Shaft	pounds	25
Weight, Hand Wheel	pounds	8

McCool Pulverizers



The McCool Pulverizer is a disc-type grinder designed for grinding virtually any material, and for pulverizing to any mesh, at one operation. It is particularly adapted for the assay office, the metallurgical, the chemical and the industrial laboratory. It is economical, simple, powerful, rugged, durable, and amazingly rapid and efficient.

A self-locking device holds the hinged grinding chamber in place and affords easy and quick access to grinding chamber for removing ground samples and for cleaning.

Oil is carried to every moving part by a combined ring and splash system, and the gears run noiselessly in a bath of oil. A gauge indicates the condition of the oil-supply at all times.

It is made in 2 sizes as follows:

Model 6½F, which is equipped with discs 7 inches in diameter and will reduce an 8-ounce sample of quartz to 100 mesh in 30 seconds.

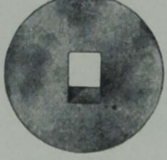
Model 9½K, which is equipped with discs 9½ inches in diameter and will reduce a one pound sample of quartz to 100 mesh in 30 seconds.

The grinding is done between 2 discs, one of which is stationary, the other revolving eccentrically at high speed. The relation of the discs is constantly altered by the eccentric movement, hence the discs cannot groove, no matter how fine or coarse the product, but will remain smooth and deliver uniform and dependable service until worn out.

The adjustment of the grinding discs to each other is automatic and positive and may be made while the machine is in operation.

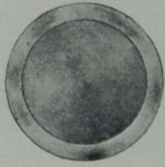
Stationary Grinding Discs

Type A



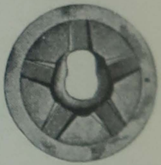
Flat Face

Type B



Plain Concave

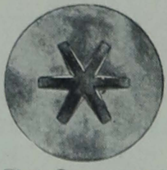
Type C



Concave Corrugated

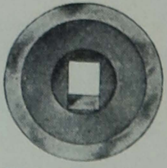
Rotary Grinding Discs

Type A



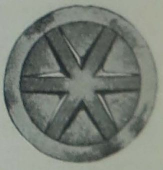
Flat Corrugated

Type B



Plain Concave

Type C



Concave Corrugated

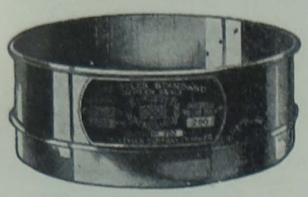
The grinding discs are made of special alloy in 3 types. For general purposes Type C discs give best results. When ordering discs, however, it would be advisable to indicate the kind of material to be pulverized, as well as the desired fineness of the finished product.

McCool Pulverizer Specifications

Model No		**6½F**	**9½K**
Each		**$150.00**	**250.00**
H.P		1	2
Speed	r.p.m.	250	275
Pulley	inches	11x3	12x4
Dimen. Over All (Lgth.xHt.xWidth)	in.	30x14½x11	34x20x15
*Capacity per Hour	pounds	30	60
Weight	pounds	330	570

*¼-inch feed of hard rock to 100 mesh.

Tyler Standard Screen Scale Testing Sieves



Uniform square mesh testing sieves are a necessity in making intelligent comparison of tests.

The Tyler Standard Testing Sieves are made 6 to 18 inches in diameter and from 4-inch opening to 400 mesh. For laboratory use, the 8-inch diameter sieve with brass frame is recommended.

The 6 and 8-inch sieves are made with dies that produce a seamless metal rim across which the cloth is stretched tightly. Sieves of these diameters are also furnished with bottom pan and cover which are pressed from a sheet of metal and made to fit each sieve in the set. The use of pan and cover cannot be urged too forcibly, as they facilitate the sifting operation and protect the fine wire cloth from injury when not in use.

Covers will be furnished either flat or with handles. Pans can also be furnished with extended rims, so that the pans will nest in the series of sieves the same as the sieves themselves. Nested sieves are supplied, (the extended rim of each sieve fits the top of any sieve of the same diameter).

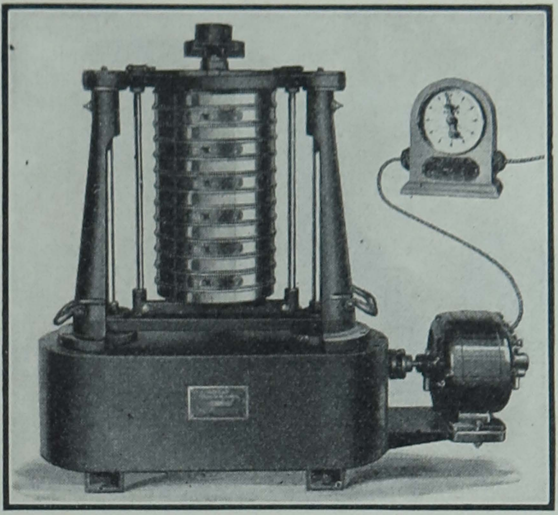
The screen scale shown below has as its base an opening of .0029 inch, which is the opening in 200 mesh .0021-inch wire, the standard sieve, as adopted by the U.S. Bureau of Standards, the openings increasing the ratio of the fourth root of 2 or 1.189.

Tyler Standard Screen Scale $\sqrt{2}$ or 1.414 Openings in Inches	For Closer Sizing Sieves from .0015" to 3.000" Ratio $\sqrt[4]{2}$ or 1.189	Opening in Millimeters	Mesh	Diam. of Wire, Dec. of an Inch	U. S. Series Equiv. No.	6-Inch Diam. Each	8-Inch Diam. Each	10-Inch Diam. Each	12-Inch Diam. Each
.....	3	......	.....	.207	...	....	$5.00	$9.50	$11.00
.....	2	......	.....	.192	...	....	5.00	9.50	11.00
.....	1½	......	.....	.148	...	....	5.00	9.50	11.00
1.050	1.050	26.67	.....	.148	...	$4.25	5.00	9.50	11.00
.....	.883	22.43	.....	.135	...	4.25	5.00	9.50	11.00
.742	.742	18.85	.....	.135	...	4.25	5.00	9.50	11.00
.....	.624	15.85	.....	.120	...	4.25	5.00	9.50	11.00
.525	.525	13.33	.....	.105	...	4.25	5.00	9.50	11.00
.....	.441	11.20	.....	.105	...	4.25	5.00	9.50	11.00
.371	.371	9.423	.....	.092	...	4.25	5.00	9.50	11.00
.....	.312	7.925	2½	.088	...	4.25	5.00	9.50	11.00
.263	.263	6.680	3	.070	...	4.25	5.00	9.50	11.00
.....	.221	5.613	3½	.065	...	4.25	5.00	9.50	11.00
.185	.185	4.699	4	.065	4	4.25	5.00	9.50	11.00
.....	.156	3.962	5	.044	5	3.75	4.50	9.00	10.50
.131	.131	3.327	6	.036	6	3.75	4.50	9.00	10.50
.....	.110	2.794	7	.0328	7	3.75	4.50	9.00	10.50
.093	.093	2.362	8	.032	8	3.75	4.50	9.00	10.50
.....	.078	1.981	9	.033	10	3.75	4.50	9.00	10.50
.065	.065	1.651	10	.035	12	3.75	4.50	9.00	10.50
.....	.055	1.397	12	.028	14	3.75	4.50	9.00	10.50
.046	.046	1.168	14	.025	16	3.75	4.50	9.00	10.50
.....	.0390	.991	16	.0235	18	3.75	4.50	9.00	10.50
.0328	.0328	.833	20	.0172	20	3.75	4.50	9.00	10.50
.....	.0276	.701	24	.0141	25	3.75	4.50	9.00	10.50
.0232	.0232	.589	28	.0125	30	3.75	4.50	9.00	10.50
.....	.0195	.495	32	.0118	35	3.75	4.50	9.00	10.50
.0164	.0164	.417	35	.0122	40	3.75	4.50	9.00	10.50
.....	.0138	.351	42	.0100	45	3.75	4.50	9.00	10.50
.0116	.0116	.295	48	.0092	50	3.75	4.50	9.00	10.50
.....	.0097	.246	60	.0070	60	3.75	4.50	9.00	10.50
.0082	.0082	.208	65	.0072	70	3.75	4.50	9.00	10.50
.....	.0069	.175	80	.0056	80	3.75	4.50	9.00	10.50
.0058	.0058	.147	100	.0042	100	4.50	5.25	9.75	11.25
.....	.0049	.124	115	.0038	120	4.75	5.50	10.00	11.50
.0041	.0041	.104	150	.0026	140	6.00	7.25	12.75	14.75
.....	.0035	.089	170	.0024	170	7.25	8.50	14.00	16.50
.0029	.0029	.074	200	.0021	200	8.50	10.00	15.75	19.00
.....	.0024	.061	250	.0016	230	14.00	18.00	.....	.....
.0021	.0021	.053	270	.0016	270	18.50	25.00	.....	.....
.....	.0017	.043	325	.0014	325	22.00	30.00	.....	.....
.0015	.0015	.038	400	.001	...	41.50	56.50	.....	.....

Standard Sieves in general use are the 8-inch diameter, full height. These are in stock at all times ready for shipment on receipt of order.

Prices for pans and covers on application.

Ro-Tap Testing Sieve Shakers



Screen analyses made by hand sieving methods are not sufficiently accurate or reliable for present day methods. All crushing, pulverizing, and screening equipment has a point of most desirable production—to go below this point reduces profits. Where the product is too coarse, it may be unsatisfactory for use; and where the product is too fine, the tonnage of both crushers and screens is reduced. To maintain the most profitable production, frequent sieve tests must be made of the feed materials and products of both crushers and screens. The performance of crushers changes from day to day. A decrease in crushing efficiency results in a decrease in screening efficiency. Sieve analyses made at regular intervals will immediately show up any changes that occur in the performance of pulverizers, crushers, and screens.

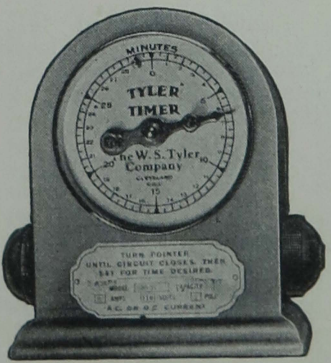
The Ro-Tap Testing Sieve Shaker, built for handling 8-inch diameter testing sieves, reproduces the circular and tapping motion given testing sieves in hand-sieving, but with a uniform, mechanical action, assuring accurate and dependable tests. From 1 to 13 sieves can be shaken with one operation of the Ro-Tap. With regular height sieve 1 sample can be tested on a series of 6 sieves of different openings; while with half-height sieves 1 sample can be analyzed on a series of 13 sieves of different openings, and all with one operation of the machine. By using pans with extended rims, 3 different samples can be tested at one time with regular height sieves and 7 samples with half-height sieves.

Simply and durably constructed and run by a ¼-h.p. electric motor, either a.c. or d.c. Furnished in 2 speeds, 1450 or 1750 r.p.m., depending on current available. Running parts operate in oil and machine is easily installed as no foundation is required. Belt drive can be used in absence of electric power.

Height 32 inches; width 34 inches; depth 17 inches.

Net weight 290 pounds including motor and Tyler Timer.

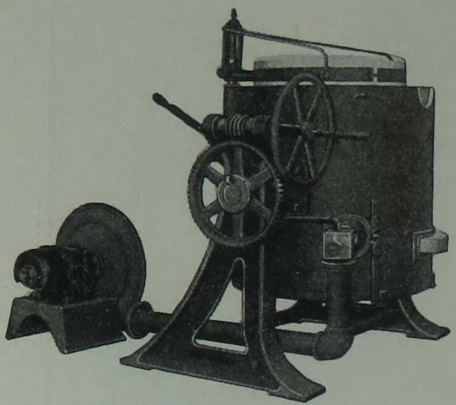
Tyler Timers



Time is an essential element in making screen analyses. This timer used with the Ro-Tap eliminates errors in timing. All that is necessary is to set the timer for the determined period of the test, and it will automatically terminate the test at the set time. The operator can meanwhile devote his attention to other work.

Prices upon application.

Massco Crucible Tilting Furnaces



For use with oil or gas and air. For melting brass, bronze, copper, aluminum and other non-ferrous metals, cyanide precipitates, gold, silver and base bullion.

Has a drop bottom which makes furnace accessible for relining. This bottom is hinged at the rear. By knocking out 2 hooks on front, entire bottom swings down.

Operated under either low pressure, 6 to 8 ounces, medium pressure, 1 to 5 pounds or high pressure, 25 to 100 pounds.

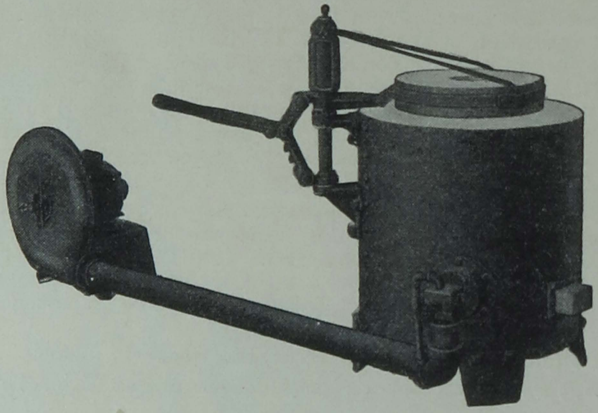
Furnished complete with furnace chamber, supports, blower, crucible, burner, oil tank and fittings.

No.	Each	Burner Low Pressure	Burner High Pressure	Cap. Crucible Gal.	Crucible No.	Cap. Cruc. Brass Lbs.	Floor Space Feet	H.P.	Wt. Lbs.
40	**$490.00**	L-1	H-2	2	40	120	3 x3	½	1950
60	**510.00**	L-2	H-2	3	60	180	3 x3⅓	1	2200
150	**605.00**	L-3	H-2	6¾	150	450	3⅓x4⅓	1½	2700
275	**710.00**	L-3	H-2	11	275	725	3⅓x4½	1½	2900

Motor Blower can be supplied separate from the furnaces when so desired.

In ordering motor blower advise voltage, phase and cycle of your electric current.

Massco Stationary Crucible Furnaces



For use with oil or gas and air. For melting brass, bronze, copper, aluminum and other non-ferrous metals, cyanide precipitates, gold, silver and base bullion.

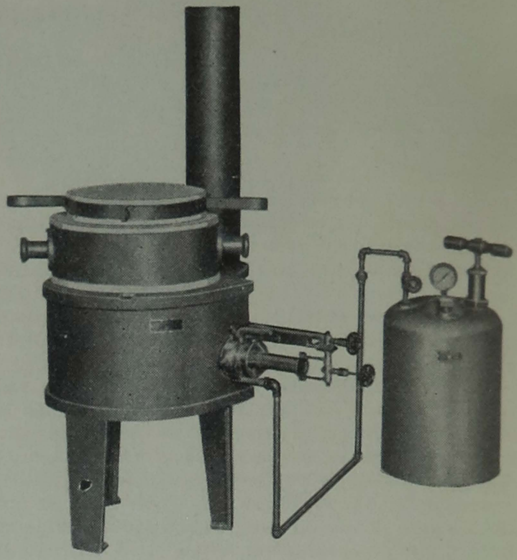
High pressure burners can be furnished if desired. In ordering motor blower give voltage, phase and cycle of electric current to be used. In the oil furnace the oil consumption is 2½ gallons to 100 pounds of metal. In the gas furnace the gas consumption is about 600 feet per 100 pounds of metal.

Furnished with motor blower, oil tank and burner.

No.	Each	Burner	Oil per Hour Gal.	Crucible No.	Crucible Cap.	Floor Space Feet	Ht. In.	H.P.	Wt. Lbs.
40	**$330.00**	L-1	2	40	120	2⅙x2⅙	30	½	1050
60	**350.00**	L-2	3	60	180	2½x2½	31	1	1350

If you do not find the furnace here to meet your requirements send for our special bulletin showing complete line and specifications.

Massco Gasoline Melting Furnaces

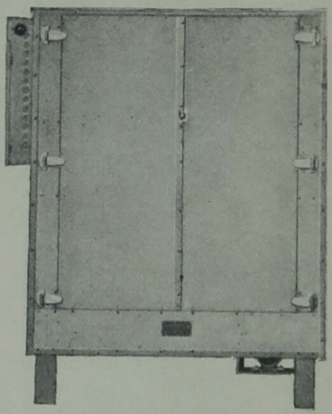


Melting furnaces furnished complete with gasoline burner, 10-gallon tank, piping and cover, but not crucible or tongs.

A ring to adapt furnace for use of Nevada Type retort for retorting amalgan can be furnished on special order.

No.	212B	212C
Each	**$90.00**	**100.00**
Crucible Size No.	25	45
Retort Size pts.	6	10
Weight lbs.	250	450

Massco Sample Drying Ovens



Designed for the quick and efficient electrical drying of ore samples by pre-heated air which is mechanically forced over each sample pan before exhausting into the atmosphere. The shelves are of solid material to eliminate the danger of salting samples below them. The air flows at a rate well below the point at which there is a possibility of particles dislodging from one pan and being deposited in another, thereby avoiding salting in this manner. The samples are not permitted to reach the boiling point of water. Cabinet constructed of sheet metal with double walls, containing ample rock wool insulation. The electric heaters are protected by a thermostat to avoid accidental overheating. The model illustrated has 9 shelves with a total capacity of eighteen 18x18x2¾-inch sample pans, and dries sample of 70% moisture content in from 3 to 5 hours.

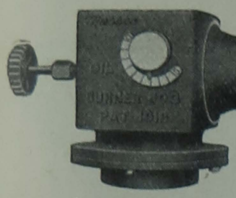
Available in any size necessary for your requirements, and to operate on any electrical specifications.

Can also be furnished with a thermostatic device cutting off the oven immediately upon completion of the drying cycle.

Each **$325.00**

Massco Oil Burners

Low Pressure



Low Pressure

The Massco Burner has been developed for use in connection with Massco Furnaces.

It can also be used with other furnaces or heating devices.

It completely atomizes the oil and any oil lighter than 18° Baume may be used and fed to the burner by gravity.

Made in 5 different styles.

Low pressure, medium pressure, high pressure, combination high and low pressure, gas burner combination type.

No.	Oil per Hour Gallons Min.	Oil per Hour Gallons Max.	Calculated H.P.	Motor H.P.	Style Furnace	Blower Size	Wt. Lbs.
L-1	½	1½	.22	¼	Muffle	14-A	12
L-2	½	2	.51	¾	“ Crucible	16	12
L-3	1½	5	1.2	1½	Crucible	16	16
L-4	2¾	12	1.8	3	Potless	16	25
L-5	4	25	3.75	5	Hearth	18	40

Our Low Pressure Motor Driven Blowers, same as illustrated with our Massco Furnaces, are recommended for use with Massco Oil Burners.

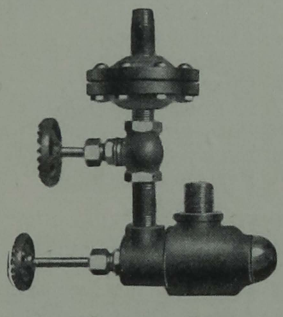
Prices upon application.

High Pressure

The Massco High Pressure Burner is designed to operate from 25 to 100 pounds pressure. Either air or steam may be utilized as an atomizing medium.

The stem of the nozzle is spirally fluted so that the air or steam rotates when it meets the oil, resulting in a complete atomization of the oil.

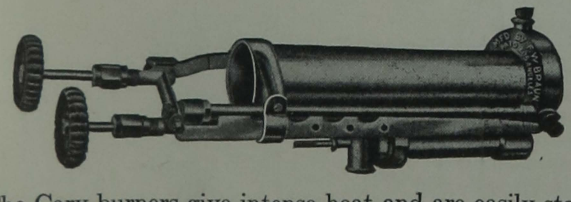
H-2 High Pressure Burner weighs 10 pounds.



High Pressure Burner with Oil Strainer

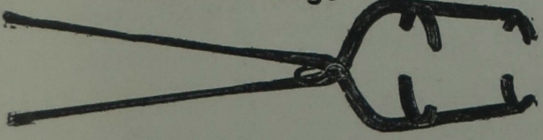
Special bulletins giving more detailed information and description of our different types of burners will be furnished upon request.

Cary Hydro-Carbon Burners



The Cary burners give intense heat and are easily started, having a special generating trough and valve. They will suck enough air through the mixing tube to give perfect combustion. The Regular pattern is intended for burning against a furnace. The Industrial pattern is so proportioned as to give perfect combustion in the open air and is recommended to machinists and boiler makers for brazing, making shrinking fits, bending pipes or rods, heating rivets, pulley hubs, etc.

Crucible Tongs



Used when lifting black-lead or other heavy crucibles with a crane. Used for crucibles Nos. 10 to 20, 25 to 50, 60 to 100 and 125 to 150. Prices upon application.

Dixon's Graphite Crucibles and Covers

DIXON
DIXON
DIXON
DIXON
DIXON
COVER

Many foundrymen do not fully appreciate the importance of handling crucibles in a manner which will insure the greatest number of heats with the least danger of accidents. The graphite crucible is now in almost universal use, having supplanted the clay crucible, which lasted only a heat or two and was exceedingly unreliable. Even the graphite crucible, the most efficient melting pot yet invented or likely to be invented, is necessarily a fragile and delicate thing. It is expected to withstand successfully degrees of heat sufficient to melt the most refractory metals, from composition to nickel, and no known vessel can long withstand such savage punishment. Any defect in, or accident to, a crucible is annoying and expensive, and such occurrences are in most cases due to improper or careless methods in the annealing or handling of crucibles. Graphite is the product of a temperature beyond the limits of calculation which enables it to bear up under degrees of heat that will melt other minerals.

Booklet, “Crucibles, Their Care and Use” gladly furnished upon request.

No.	Height Outside Inches	Diam. at Top Outside Inches	Diam. at Bilge Outside Inches	Diam. at Bottom Outside Inches	Approx. Cap. in Water Pounds	Price per Dozen
0	2	1½	1½	1³⁄₁₆	¹⁄₃₂	$4.50
00	2¼	1¹³⁄₁₆	1¹³⁄₁₆	1⅜	²⁄₃₂	4.50
000	2⁹⁄₁₆	2	1¹⁵⁄₁₆	1½	¹⁄₃₂	4.50
0000	2¹⁵⁄₁₆	2⅜	2⅜	1¾	⁷⁄₃₂	4.50
½	3¼	3	3	2⅛	¹²⁄₃₂	5.25
1	3⅝	3¼	3⅛	2¼	½	5.75
1½	4¹⁄₁₆	3⁹⁄₁₆	3¾	2⅜	⅝	6.20
2	4½	3¾	3¹¹⁄₁₆	2½	¾	6.50
3	5⅜	4¼	4⅛	3	1	7.75
4	5¾	4⅝	4⁹⁄₁₆	3³⁄₁₆	1½	9.60
5	6⅛	4⅞	4⅞	3½	1¾	12.00
6	6½	5¼	5¼	3⅞	2¼	14.00
7	6¾	5½	5½	4	2½	15.50
8	7⅛	5⅞	5⅞	4¼	3	17.25
9	7⅝	5⅞	6¼	4¾	3½	19.40
10	8¹⁄₁₆	6¹⁄₁₆	6⁹⁄₁₆	4¹⁵⁄₁₆	4.8	21.60
12	8½	6⅜	6⅞	5¹⁄₁₆	Pouring Capacity three pounds metal to number	
14	8⅞	6¹¹⁄₁₆	7³⁄₁₆	5¼		
16	9¼	6¹⁵⁄₁₆	7½	5½		
18	9¹³⁄₁₆	7⁵⁄₁₆	7¹⁵⁄₁₆	5¹³⁄₁₆		Per No.
20	10⁵⁄₁₆	7¹¹⁄₁₆	8⅜	6⅛		
25	10¹⁵⁄₁₆	8³⁄₁₆	8⅞	6½		
30	11½	8⅝	9⁵⁄₁₆	6¹³⁄₁₆		
35	12	9	9¾	7⅛		
40	12½	9⅜	10⅛	7⁷⁄₁₆		
45	13³⁄₁₆	9⅞	10¹¹⁄₁₆	7¹³⁄₁₆		
50	13¾	10¼	11⅛	8⅛		
60	14⁷⁄₁₆	10¹³⁄₁₆	11¹¹⁄₁₆	8⁹⁄₁₆		
70	15¹⁄₁₆	11¼	12³⁄₁₆	8¹⁵⁄₁₆		
80	15⅝	11¹¹⁄₁₆	12¹¹⁄₁₆	9¼		
90	16³⁄₁₆	12⅛	13⅛	9⁹⁄₁₆		
100	16¹¹⁄₁₆	12½	13½	9⅞		Per No.
125	17⅜	13	14¹⁄₁₆	10⁵⁄₁₆		
150	18⅜	13¾	14⅞	10⅞		
175	19¼	14⅜	15⁹⁄₁₆	11⅜		
200	20	15	16¼	11⅞		
225	20¾	15½	16¹³⁄₁₆	12⁵⁄₁₆		
250	21⅜	16	17⁵⁄₁₆	12¹¹⁄₁₆		
275	22	16⁷⁄₁₆	17¹³⁄₁₆	13		
300	22½	16⅞	18¼	13⅜		
400	24⁵⁄₁₆	18³⁄₁₆	19¹¹⁄₁₆	14⁷⁄₁₆		

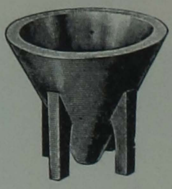
One pound of water equals .96 pints or 27.7 cubic inches.

Covers for Graphite Crucibles

Price, Nos.	**0–00–000–0000**	per dozen	**$2.00**
Price, Nos.	½ to **5**	per dozen	**3.00**
Price, Nos.	**6** to **10**	per dozen	**3.60**
Price, Nos.	**12** to **20**	per number	**.03**
Price, Nos.	**25** to **400**	per number	**.025**

Molds

No. 304-F



Metal mold.

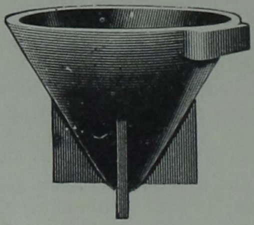
Diameter at top, 7½ inches.

Depth, 5 inches.

Weight, 15 pounds.

No. **304**-F....................................each **$1.75**

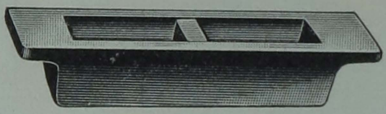
No. 304-G



Pouring mold for black lead crucible.

Crucible Size No.	Each	Diameter Inches	Height Inches	Weight Pounds
6	**$2.50**	7½	6	16
10	**4.00**	9½	7½	27
16	**5.00**	10¾	9	35
25	**6.50**	12½	10½	50
35	**7.50**	14	12	60
50	**10.00**	15¼	11	85
80	**12.00**	17¼	13	105
100–125	**15.00**	19½	15	135
150	**17.00**	22	17	170

No. 304-M



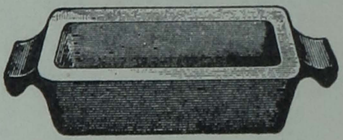
Ingot or bullion mold.

Inside diameter, 1½x1½x8 inches with sliding bar to cast any length desired.

Capacity, 150 ounces gold; 75 ounces silver.

No. **304**-M....................................each **$1.50**

No. 304-N



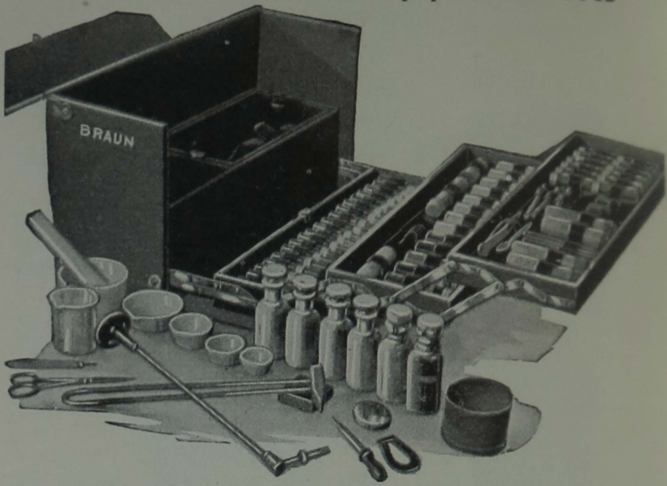
Ingot or bullion mold. Capacity of mold is figured filled within about 3/16 inch of top.

Size Inches	Cap., Oz.		Each
	Gold	Silver	
3½x1 x1	20	10	**$1.10**
3½x1½x1½	50	25	**1.75**
4 x2 x2	100	56	**2.00**
5½x2½x2½	250	140	**3.00**
6½x3¼x3¼	500	275	**3.25**
9 x3¾x3¾	1000	550	**5.00**
11 x4¾x4¾	2000	1100	**7.00**
11½x5¼x4½	2500	1350	**9.00**
15 x7 x6	5000	3000	**12.00**

Lettering can be furnished when desired.

Extra....................................per letter **$.15**

No. 39760 Braun Blowpipe Test Sets



This set enables complete qualitative determinations of minerals to be made in the field. It is used according to methods given by J. D. Dana in his text book "A System of Mineralogy" and in other standard texts. Contains a collection of 50 carefully selected typical mineral specimens for making comparison tests; in screw-cap vials neatly labeled. The carrying case measures 16x8x6 inches.

Carefully packed to withstand rough transportation. All acids packed separately. Shipping weight, 20 pounds.

Test Pieces

1. Anvil, Polished Steel
2. Plattner's Blowpipe
3. Porcelain Mortar and Pestle
4. Alcohol Lamp
5. Beaker
6. Charcoal Block
7. Evaporating Dish
8. Porcelain Crucibles
9. Forceps, 5-Inch
10. Forceps, Platinum Tipped
11. Hammer
12. Horseshoe Magnet
13. Pipette
14. Platinum Wire Holder
15. 3 Pieces Platinum Wire
16. Scissors
17. Horn Spoon
18. Test Lead Measure
19. 3 Open Glass Tubes
20. 3 Closed Glass Tubes
21. Magnifier, 1-Inch
22. Blue Litmus Paper
23. Red Litmus Paper
24. Turmeric Paper
25. Brazil Wood Paper
26. Borax Glass
27. Borax Powder
28. Bone Ash
29. Antimony Oxide
30. Arsenous Acid
31. Salt Phosphorus
32. Soda Carbonate
33. Soda Nitrate
34. Alcohol
35. Ammonia Hydroxide
36. Hydrochloric Acid
37. Copper Oxide
38. Iron Oxide
39. Lead Oxide
40. Manganese Oxide
41. Mercury Oxide
42. Potash Bisulphate
43. Test Lead
44. Tin Oxide
45. Cobalt Nitrate Sol.
46. Nitric Acid
47. Sulphuric Acid

Mineral Specimens

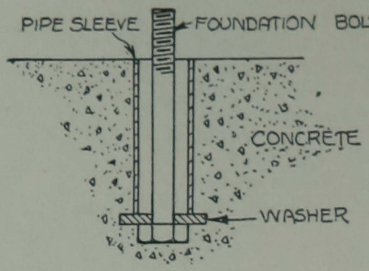
1. Graphite
2. Sulphur
3. Stibnite
4. Chalcopyrite
5. Galenite
6. Rutile
7. Pyrrhotite
8. Pyrite
9. Hematite
10. Magnetite
11. Chromite
12. Limonite
13. Siderite
14. Pyrolusite
15. Rhodonite
16. Sphalerite
17. Willemite
18. Corundum
19. Cryolite
20. Fluorite
21. Calcite
22. Apatite
23. Gypsum
24. Dolomite
25. Barite
26. Magnesite
27. Celestite
28. Strontianite
29. Halite
30. Quartz
31. Orthoclase
32. Witherite
33. Albite
34. Spodumene
35. Hornblende
36. Wollastonite
37. Beryl
38. Garnet
39. Mica
40. Lepidolite
41. Chrysolite
42. Scapolite
43. Tourmaline
44. Cyanite
45. Pyrophyllite
46. Talc
47. Datolite
48. Prehnite
49. Pectolite
50. Stilbite

No. **39760**....................................per set **$44.00**

. . . CHEMICALS . . .

Acetone, C. P.	In bulk and 55-gallon drums
Acid, Acetic 28%	In bulk and 100-lb. carboys
56%	In bulk and 50-gal. bbls.
99½%, U. S. P. Glacial	In bulk and 100-lb. carboys
Acid, Cresylic	In bulk and 55-gal. drums
Acid, Hydrochloric, C. P.	6-lb. Bottles and 110-lb. carboys
Acid, Muriatic	In bulk and 112-lb. carboys
Acid, Nitric, C. P.	7-lb. bottles and 135-lb. carboys
Acid, Nitric, Com'l	In bulk and 130-lb. carboys
Acid, Sulphuric, C. P.	9-lb. bottles and 178-lb. carboys
Acid, Sulphuric, Com'l. 66 deg. Be	In bulk 175-lb. carboys and 1500-lb. drums
1225 Electrolyte	120-lb. carboys
1400 Electrolyte	135-lb. carboys
1835 Electrolyte	175-lb. carboys
Cream Testing	175-lb. carboys
Alcohol, Denatured	In bulk and 55-gal. drums
Ammonia, Anhydrous	50-lb., 100-lb., and 150-lb. cylinders
Ammonia, Aqua	In bulk and 90-lb. carboys
Ammonium Hydroxide, C. P.	4½-lb. bottles and 90-lb. carboys
Benzol, Pure	In bulk and 100-gal. drums
Bone Ash X (60 mesh)	In bulk and 500-lb. bbls.
XX (70 mesh)	In bulk and 500-lb. bbls.
XXX (80 mesh)	In bulk and 500-lb. bbls.
XXXX (90) mesh)	In bulk and 500-lb. bbls.
Borax Glass	In bulk and 100-lb. cases (2x50-lb. cans)
Borax, Fine Granular	In bulk and 100-lb. bags
Borax, Powdered	In bulk, 100-lb. bags and 375-lb. bbls.
Calcium Chloride, Flake	In bulk, 100-lb. bags and 400-lb. drums
Solid	720-lb. drums
Carbide	See Catalog, page 521
Carbon Disulphide	In bulk and 55-gal. drums
Carbon Tetrachloride	In bulk and 700-lb. drums
Caustic Soda	See Soda Caustic
Chemicals, C. P. and U. S. P.	Write for Special Catalog
Chloride of Lime	10-lb. cans, 100-lb. and 300-lb. drums
Chlorine, Liquid	100-lb. cylinders
Chloroform, Tech	In bulk and 55-lb. drums
Copper Sulphate, large and small crystals	In bulk and 450-lb. bbls.
Creosote, Coal Tar and Hardwood	In bulk and 50-gal. drums
Cyanide	See Sodium Cyanide
Ether, Tech	In bulk and 55-lb. drums
Fire Clay	In bulk and 100-lb. bags
Glycerine, C. P.	In bulk and 100-gal. drums
Hytempite (high temperature cement)	In bulk, 100-lb., 500-lb., and 800-lb. drums
Iron Sulphate, Granular	In bulk and 400-lb. bbls.
Lead, Acetate, Granular	In bulk and 600-lb. bbls.
Lead Foil, Assay Grade	In bulk and 5-lb. rolls
Lime, Hydrated	In bulk and 55-lb. bags
Litharge, C. P.	In bulk, 25-lb. and 50-lb. bags
Litharge, Com'l.	In bulk and 500-lb. drums
Mercury (Quicksilver)	In bulk and 76-lb. flasks
Nickel Salts—Single and double	In bulk and 500-lb. bbls.
Pine Oil	In bulk and 55-gal. drums
Pine Tar Oil	In bulk and 55-gal. drums
Potassium Carbonate	In bulk and 600-lb. bbls.
Potassium Nitrate	In bulk and 600-lb. bbls.
Silica, Powdered	In bulk and 100-lb. bags
Silver Foil, .999¾	In ounce rolls
Soda Ash, 58% light	In bulk, 150-lb. bags and 276-lb. bbls.
Soda Bicarbonate	In bulk, 112-lb. kegs and 400-lb. bbls.
Soda, Caustic, 76% Flake	In 10-lb. cans, 100-lb. and 400-lb. drums
76% Solid	In 720-lb. drums
Sodium Carbonate, Calcined	In bulk and 400-lb. bbls.
Sodium Cyanide (Cyanegg)	In 1-lb., 5-lb., 10-lb., 25-lb., and 100-lb. drums
Case Hardener	In 1-lb., 5-lb., 10-lb., 25-lb., and 100-lb. drums
Sodium Hyposulphite, Pea Crystal	In bulk and 100-lb. bags
Sodium Silicate	In bulk and 620-lb. drums
Sodium Sulphite, Flake	In bulk and 280-lb. drums
Sodium Sulphite, Crystals	In bulk and 400-lb. bbls.
Sulphur, Powdered	In bulk and 100-lb. bags
Roll	In bulk
Trisodium Phosphate	In bulk and 325-lb. bbls.
Xanthate Z-3 (Potassium Ethyl)	50-lb., 100-lb., and 250-lb. drums
Z-4 (Sodium Ethyl)	50-lb., 100-lb., and 250-lb. drums
Z-5 (Potassium Amyl)	50-lb., 100-lb., and 250-lb. drums
Z-6 (Pentasol Amyl)	50-lb., 100-lb., and 250-lb. drums
Z-7 (Primary Butyl)	50-lb., 100-lb., and 250-lb. drums
Z-8 (Secondary Butyl)	50-lb., 100-lb., and 250-lb. drums
Zinc Chloride	In bulk and 50-lb. cans
Zinc Dust	In bulk and 400-lb. drums
Zinc Shavings	In bulk and 50-lb. bags
Zinc Sulphate	In bulk and 100-lb. bags

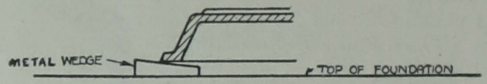
Instructions for Installing Centrifugal Pumps



1. Location.—Locate the pump in an accessible place, so it can be inspected during operation. Place pump as close to the water supply as possible, so as to make suction pipe short and direct. Provide ample head room for crane, hoist or tackle. Pump pits should be safeguarded against floods.

2. Foundation.—Pumps must have a good foundation, preferably of concrete. Locate foundation bolts according to drawing or template and arrange as per Fig. 568. Use pipe sleeve about 2½ diameters larger than the bolt (2½-inch pipe for 1-inch bolt).

3. Alignment.—Pump must be level and properly lined up. A flexible coupling will not compensate for misalignment. Every baseplate is elastic, no matter how heavy it is, and will spring to a certain extent, and can be readily brought to its original shape by the use of wedges and foundation bolts.

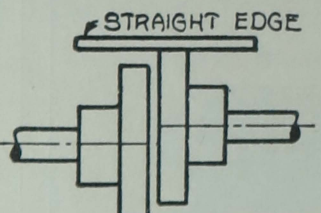


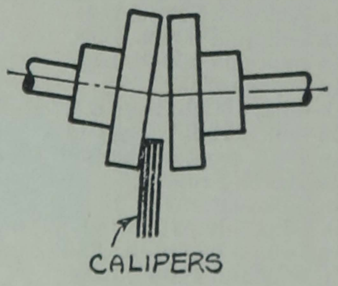
Wedge the entire outfit about ¾-inch above top of foundation; this leaves proper space for grouting (Fig. 569). Adjust wedges and level, using finished surface only.

Remove the coupling bolts, if not already removed. Check the alignment at the coupling (Fig. 570). A straight edge across the coupling must rest evenly on both rims, at the top, bottom and the sides.

With a pair of inside calipers or a thickness gauge, the distance between the coupling halves should be checked at the same points.

Whenever pump or prime mover, or both, are heated in operation (that is, steam driven prime movers, or pumps handling hot water), the unit should be aligned under these conditions. This is necessary due to changes in alignment on account of expansion from the cold to the hot machine.





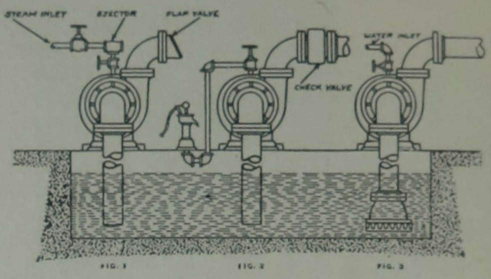
4. Grouting.—For grouting, build a dam around baseplate at least 2½ inches high. After cement has hardened, tighten the anchor bolts and recheck alignment. Any misalignment apparent now, should be corrected by placing shims under pump or motor.

5. Piping—Connect pipe lines. Pipes must line up naturally. Do not force them into place with flange bolts, as this may draw pump out of alignment. Pipes should be supported independently of pump so as not to put any strain on pump casing.

After the piping has been installed, the alignment should be checked again, and if necessary, corrected.

6. Drain Piping.—Drain the pipe connections from drip pocket to a waste line that can be readily cleaned.

Methods of Priming Horizontal Centrifugal Pumps



A centrifugal pump should always be filled with the fluid which is to be pumped before starting and unless the material flows to the pump it must be primed with one of the methods above noted.

If an injector is used as shown in Fig. 1, a flap valve must be placed in the discharge line and the injector may be operated by either steam or air.

If a hand pump is used as shown in Fig, 2, a check valve in the discharge line must be used. If a water supply under pressure is available, a foot valve must be placed at the bottom of the suction pipe in order to fill the pump.

When starting the pump, the valve in the discharge line should be kept closed until the pump has attained full speed.

Some Centrifugal Pump "Ifs"

22.—If it is necessary to operate the pump at a lower head than that for which it was built, and the speed cannot be diminished, as is sometimes the case with electric motor drives, a gate valve placed on the discharge may be used to throttle the delivery and prevent pumping an excessive quantity of water, and thus overloading the driving unit. If possible, it is better economy to slow the pump to the proper revolutions for the working head, or change the runners, which can generally be done.

23.—If after starting pump, it throws a little water at first few turns, and then churns and fails to discharge more, it is sure evidence that air was not all out of pump and pipes; suction lift is too great; a leaky suction line, or air leak along pump shaft through stuffing box.

24.—If motor-driven, be positive that proper voltage is being delivered at the motor; the use of proper size carrying wires will avoid trouble of this nature; also see that connections are properly made.

25.—If when first started pump throws a full stream for a few minutes, and then fails, it is caused by failure of supply, or water receding in the well below suction limit, which in a well is best determined by a vacuum gauge placed on the suction elbow of the pump. The remedy for this is to lower the pump.

26.—If the pump delivers a full stream of water at surface or level of pump, but fails to pump to a higher discharge point, the speed is too slow.

27.—If pump starts a full stream, and then the discharge decreases slowly until pump fails to deliver any water, it is caused by air leak at packing gland, or leak in suction piping or fittings.

28.—If the pump delivers a full quantity for a few hours and fails, the speed and water supply being unchanged, the suction pipe or impeller is obstructed.

29.—If when running there is a heavy vibration, the shaft has been bent or an obstruction has lodged in one side of the impeller or misalignment of pump or motor shaft.

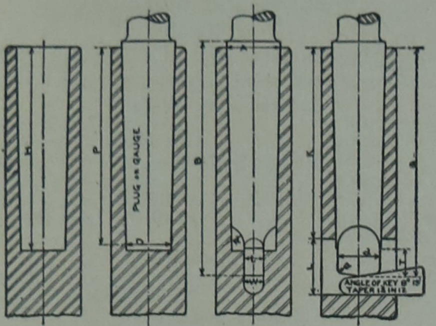
30.—If the bearings heat unduly, the belt is unnecessarily tight, the bearings lack oil, or there is end thrust.

31.—If the pump is properly installed and operated, it will positively operate successfully as the centrifugal pump is a simple, efficient water lifting device.

32.—In pumping hot water, fluids and highly volatile liquids the suction lift of the pump must be reduced, and in some cases a positive head must be obtained on the pump suction, depending on conditions under which the pump must operate.

33.—Water should not discharge into a sump or tank near the end of the suction pipe, as there is danger of carrying air down and into the suction pipe. Do not attempt to pump more than the maximum catalogue rating of the pump as that will cause waste of power.

B & S and Morse Tapers



Brown & Sharpe Tapers

No. of Taper	Diam. of Plug at Small End In. D	Diam. at End of Socket In. A	Std. Plug Depth In. P	Whole Length of Shank In. B	Depth of Hole In. H	End of Socket to Keyway In. K	Length of Keyway In. L	Width of Keyway In. W
4	.35	.402	1 1/4	1 3/4	1 3/8	1 13/64	11/16	.228
5	.45	.5229	1 3/4	2 9/32	1 7/8	1 11/16	3/4	.260
6	.50	.599	2 3/8	2 31/32	2 1/2	2 19/64	7/8	.291
6	.50	.6354	3 1/4	3 27/32	3 3/8	3 11/64	7/8	.291
7	.60	.725	3	3 5/8	3 1/8	2 29/32	15/16	.322
7	.60	.7667	4	4 5/8	4 1/8	3 29/32	15/16	.322
8	.75	.8985	3 9/16	4 1/4	3 11/16	3 29/32	1	.353
9	.90	1.0667	4	4 3/4	4 1/8	3 7/8	1 1/8	.385
10	1.0446	1.26	5	6 1/16	5 1/8	4 27/32	1 5/16	.447
10	1.0446	1.289	5 11/16	6 3/4	5 13/16	5 17/32	1 5/16	.447
10	1.0446	1.312	6 7/32	7 9/32	6 11/32	6 1/16	1 5/16	.447
11	1.25	1.53	6 3/4	7 13/16	6 7/8	6 19/32	1 5/16	.447
12	1.50	1.797	7 1/8	8 9/32	7 1/4	6 15/16	1 1/2	.510

No. of Taper	Length of Tongue In. T	Diam. of Tongue In. d	Thick. of Tongue In. t	Radius of Mill for Tongue In. R	Radius of Tongue In a	Shank Depth In. S	Taper per Foot	Taper per Inch
4	11/32	.320	7/32	5/16	.050	1 21/32	.500	.0416
5	3/8	.420	1/4	5/16	.060	2 3/16	.500	.0416
6	7/16	.460	9/32	5/16	.060	2 7/8	.500	.0416
6	7/16	.460	9/32	5/16	.060	3 3/4	.500	.0416
7	15/32	.560	5/16	3/8	.070	3 17/32	.500	.0416
7	15/32	.560	5/16	3/8	.070	4 17/32	.500	.0416
8	1/2	.710	11/32	3/8	.080	4 1/8	.500	.0416
9	9/16	.860	3/8	7/16	.100	4 5/8	.500	.0416
10	21/32	1.01	7/16	1/2	.110	5 23/32	.5161	.043
10	21/32	1.01	7/16	1/2	.110	6 13/32	.5161	.043
10	21/32	1.01	7/16	1/2	.110	6 15/16	.5161	.043
11	21/32	1.21	7/16	1/2	.130	7 15/32	.500	.0416
12	3/4	1.46	1/2	1/2	.150	7 15/16	.500	.0416

Morse Tapers

No. of Taper	Diam. of Plug at Small End In. D	Diam. at End of Socket In. A	Std. Plug Depth In. P	Whole Length of Shank In. B	Depth of Hole In. H	End of Socket to Keyway In. K	Length of Keyway In. L	Width of Keyway In. W
0	.252	.356	2	2 11/32	2 1/32	1 15/16	9/16	.160
1	.369	.475	2 1/8	2 9/16	2 3/16	2 1/16	3/4	.213
2	.572	.700	2 9/16	3 1/8	2 5/8	2 1/2	7/8	.260
3	.778	.938	3 3/16	3 7/8	3 1/4	3 1/16	1 1/16	.322
4	1.02	1.231	4 1/16	4 7/8	4 1/8	3 7/8	1 1/4	.478
5	1.475	1.748	5 3/16	6 1/8	5 1/4	4 15/16	1 1/2	.635
6	2.116	2.494	7 1/4	8 5/8	7 3/8	7	1 3/4	.76
7	2.75	3.27	10	11 5/8	10 1/8	9 1/2	2 5/8	1.135

No. of Taper	Length of Tongue In. T	Diam of Tongue In. d	Thick. of Tongue In. t	Radius of Mill for Tongue In. R	Radius of Tongue In. a	Shank Depth In. S	Taper per Foot	Taper per Inch	No. of Key
0	9/32	.24	5/32	5/32	.04	2 7/32	.625	.05208	0
1	3/8	.35	13/64	3/16	.05	2 7/16	.600	.05	1
2	7/16	.55	1/4	1/4	.06	2 15/16	.602	.05016	2
3	9/16	.75	5/16	9/32	.08	3 11/16	.602	.05016	3
4	5/8	.98	15/32	5/16	.10	4 5/8	.623	.05191	4
5	3/4	1.41	5/8	3/8	.12	5 7/8	.630	.0525	5
6	1 1/8	2.	3/4	1/2	.15	8 1/4	.626	.05216	6
7	1 1/2	2 11/16	1 1/8	3/4	.18	11 1/4	.625	.05208	7

Useful Information

Standard Threads for Bolts and Pipe

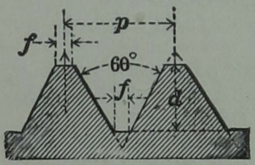
U. S. S. Bolt Threads					Pipe Threads		
Diameter Inches	Threads per Inch	Short Diameter of Nut Inches	Diameter of Hole in Nut, Inches Decimals	Diameter of Hole in Nut, Inches Fractions	Diameter Inches	Threads per Inch	Diameter of Drill Inches
1/4	20	1/2	.185	3/16	1/8	27	21/64
5/16	18	19/32	.240	1/4	1/4	18	27/64
3/8	16	11/16	.294	19/64	3/8	18	9/16
7/16	14	25/32	.344	11/32	1/2	14	11/16
1/2	13	7/8	.400	13/32	3/4	14	29/32
9/16	12	31/32	.454	29/64	1	11 1/2	1 1/8
5/8	11	1 1/16	.507	33/64	1 1/4	11 1/2	1 15/32
3/4	10	1 1/4	.620	5/8	1 1/2	11 1/2	1 23/32
7/8	9	1 7/16	.731	47/64	2	11 1/2	2 3/16
1	8	1 5/8	.837	27/32	2 1/2	8	2 9/16
1 1/8	7	1 13/16	.940	15/16	3	8	3 3/16
1 1/4	7	2	1.065	1 1/16	3 1/2	8	3 11/16
1 3/8	6	2 3/16	1.160	1 5/32	4	8	4 3/16
1 1/2	6	2 3/8	1.284	1 9/32	4 1/2	8	4 11/16
1 5/8	5 1/2	2 9/16	1.389	1 13/32	5	8	5 1/4
1 3/4	5	2 3/4	1.490	1 1/2	6	8	6 5/16
1 7/8	5	2 15/16	1.615	1 5/8	7	8	7 5/16
2	4 1/2	3 1/8	1.712	1 23/32	8	8	8 5/16
2 1/4	4 1/2	3 1/2	1.962	1 15/32	9	8	9 5/16
2 1/2	4	3 7/8	2.175	2 11/64	10	8	10 7/16
2 3/4	4	4 1/4	2.425	2 27/64	11	8	11 11/16
3	3 1/2	4 5/8	2.628	2 41/64	12	8	12 7/16
3 1/4	3 1/2	5	2.878	2 7/8			
3 1/2	3 1/4	5 3/8	3.100	3 7/64			
3 3/4	3	5 3/4	3.317	3 5/16			
4	3	6 1/8	3.566	3 9/16			

Standard taper of pipe threads is 1-inch in 16, or 3/4-inch to foot.

Basic Thread Dimensions

United States Standard Thread

Formulae



$$P = \text{pitch} = \frac{1}{\text{No. of threads per inch}}$$

$$D = \text{depth} = \text{pitch} \times .649519 \text{ or } \frac{.649519}{n}$$

$$F = \text{flat} = \frac{\text{pitch}}{8}$$

N = threads per inch.

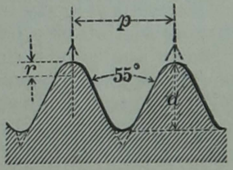
Whitworth Standard Thread

Formulae

$$P = \text{pitch} = \frac{1}{\text{No. threads per inch}}$$

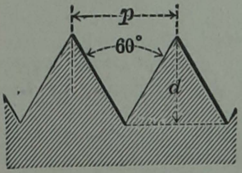
D = depth = pitch x .64033.

R = radius = " x .1373.



Sharp V Thread

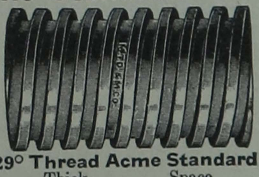
Formulae



$$P = \text{pitch} \frac{1}{= \text{No. of threads per inch}}$$

D = depth = pitch x .86603.

Acme Standard Thread



29° Thread Acme Standard

Threads per Inch Linear	Depth of Thread	Thickness at Top of Thread	Space at Bottom of Thread	Space at Top of Thread	Thickness at Root of Thread
1	.5100	.3707	.3655	.6293	.6345
2	.2600	.1853	.1801	.3147	.3199
3	.1767	.1235	.1183	.2098	.2150
4	.1350	.0927	.0875	.1573	.1625
5	.1100	.0741	.0689	.1259	.1311
6	.0933	.0618	.0566	.1049	.1101
7	.0814	.0529	.0478	.0899	.0951
8	.0725	.0463	.0411	.0787	.0839
9	.0655	.0413	.0361	.0699	.0751
10	.0600	.0371	.0319	.0629	.0681

Useful Information

To reduce pounds pressure to feet head, multiply by 2.3.

To reduce heads in feet to pressure in pounds, multiply by 433.

Friction of liquids in pipes increases as the square of the velocity.

Doubling the diameter of a pipe increases its capacity four times.

To find the area of a pipe, square the diameter and multiply by .7854.

A cubic foot of water weighs 62½ pounds and contains 1728 cubic inches or 7½ U. S. gallons.

Approximately, every foot elevation of a column of water produces a pressure of ½ pound per square inch.

A "miner's inch" of water is approximately equal to a supply of 12 gallons per minute. In California, 9 gallons.

The gallons per minute which a pipe will deliver equals .0408 times the square of the diameter, multiplied by the velocity in feet per minute.

To find the capacity of a pipe or cylinder in gallons, multiply the square of the diameter in inches by the length in inches and by .0034.

The weight of water in any length pipe is obtained by multiplying the length in feet by the square of the diameter in inches, and by .34.

To find the discharge from any pipe in cubic feet per minute, square the diameter and multiply by the velocity in feet per minute and by .00545.

U. S. gallon of water weighs 8⅓ pounds and contains 231 cubic inches. An imperial gallon weighs 10 pounds and contains 277 cubic inches.

To find the diameter of pipe in inches, divide the gallons per minute by the velocity in feet per minute, and multiply the square root of the quotient by 4.95.

To find the capacity of a given tank or cistern in U. S. gallons, square the diameter (in feet), and multiply by .7854, multiply by the height in feet, and by 7.48.

To find the discharge in U. S. gallons per minute from any pipe, square the diameter in inches, multiply by the velocity in feet per second and by 2.448.

The discharge from a pipe in cubic feet per second is equal to the mean velocity in feet per second multiplied by the area of cross section of pipe in square feet.

Sharp angles or sudden bends in pipes cause great increase in friction, consequently increase of power is necessary. Where change of direction is desired the same should be by means of long easy curves.

To determine *theoretical horse power* to elevate water to a given height, multiply the number of gallons delivered per minute by 8.33 (weight of 1 gallon of cold water), multiply this result by the total head in feet (total head equals actual head plus head due to friction—see Friction Table). Divide this result by 33000 (33000 pounds elevated 1 foot in 1 minute equals 1 horse power). To determine *actual horse power* divide the theoretical horse power by the efficiency of the pump. EXAMPLE:

We wish to elevate 100 gallons per minute to an elevation of 100 feet through 200 feet of 2-inch pipe with two elbows and one valve in the pipe. Pump having an efficiency of 60 per cent. 100 Elevation + 43.5 (friction in 200 feet of 2-inch pipe) + 3 (friction in two elbows) + 1.7 (friction in one valve) = 148.2 Total Head.

$$\frac{100 \times 8.33 \times 148.2 :}{33000} = 3.74 \text{ Theo. H. P. } 3.74 \div 60\% \text{ Eff. of Pump} = 6.2 \text{ Actual H. P.}$$

To determine the efficiency of a centrifugal pump divide the theoretical horse power as above, by the actual horse power required to operate the pump, and multiply the result by 100.

EXAMPLE:

$$\frac{3.74 \text{ (Theo. H. P.)} \times 100}{6.2 \text{ (Actual H. P.)}} = 60\% \text{ Efficiency of Pump.}$$

SUCTION LIFT means the vertical distance from the level of the water supply to the center of the pump, to which must be added the loss due to friction of the water in the suction pipe.

DISCHARGE HEAD means the vertical distance from the center of the pump to the center of the discharge outlet where the water is delivered, to which must be added the loss due to friction of the water in the discharge pipe.

TOTAL HEAD means the sum of the suction lift, discharge head, and all friction loss in both suction and discharge pipes.

Useful Information

Weights and Measures

Troy Weight

24 grains = 1 pwt.
20 pwts. = 1 ounce.
12 ounces = 1 pound.
Used for weighing gold, silver and jewels.

Apothecaries' Weight

20 grains = 1 scruple.
3 scruples = 1 dram.
8 drams = 1 ounce.
12 ounces = 1 pound.

Avoirdupois Weight

27 $\frac{11}{32}$ grains = 1 dram.
16 drams = 1 ounce.
16 ounces = 1 pound.
25 lbs. = 1 quarter.
4 quarters = 1 cwt.
2,000 lbs. = 1 short ton.
2,240 lbs. = 1 long ton.

Dry Measure

2 pints = 1 quart.
8 quarts = 1 peck.
4 pecks = 1 bushel.
36 bushels = 1 chaldron.

Liquid Measure

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon.
31½ gallons = 1 barrel.
2 barrels = 1 hogshead.

Time Measure

60 seconds = 1 minute.
60 minutes = 1 hour.
24 hours = 1 day.
7 days = 1 week.
28, 29, 30 or 31 days = 1 calender month (30 days = 1 month in computing interest).
365 days = 1 year.
366 days = 1 leap year.

Circular Measure

60 seconds = 1 minute.
60 minutes = 1 degree.
30 degrees = 1 sign.
90 degrees = 1 quadrant.
4 quadrants = 12 signs, or 360 degrees = 1 circle.

Long Measure

12 inches = 1 foot.
3 feet = 1 yard.
5½ yards = 1 rod.
40 rods = 1 furlong.
8 furlongs = 1 stat. mile.
3 miles = 1 league.

Cloth Measure

2¼ inches = 1 nail.
4 nails = 1 quarter.
4 quarters = 1 yard.

Mariners' Measure

6 feet = 1 fathom.
120 fathoms = 1 cable length.
7½ cable lengths = 1 mile.
5,280 feet = 1 stat. mile.
6,085 feet = 1 nautical mile.

Miscellaneous

3 inches = 1 palm.
4 inches = 1 hand.
6 inches = 1 span.
18 inches = 1 cubit.
21.8 in. = 1 Bible cubit.
2½ ft. = 1 military step.

Square Measure

144 sq. in. = 1 sq. foot.
9 sq. ft. = 1 sq. yd.
30¼ sq. yds. = 1 sq. rod.
40 sq. rods = 1 rood.
4 roods = 1 acre.
640 acres = 1 sq. mile.

Surveyors' Measure

7.92 inches = 1 link.
4 rods = 1 chain.
25 links = 1 rod.
10 square chains or 160 square rods = 1 acre.
640 acres = 1 sq. mile.
36 square miles (6 miles square) = 1 township.

Cubic Measure

1,728 cu. in. = 1 cu. ft.
27 cu. ft. = 1 cu. yd.
128 cu. ft. = 1 cord (wood)
40 cu. ft. = 1 ton (ship'g)
2,150.42 cu. inches = 1 standard bushel.
268.8 cubic inches = 1 standard gallon.
1 cubic ft. = about ⅘ of a bushel.

Metric Equivalents

Linear Measure

1 centimeter = 0.3937 in.	1 in. = 2.54 centimeters.
1 decimet'r = 3.937 in. = 0.828 feet.	1 ft. = 3.048 decimeters.
1 meter = 39.37 in. = 1.0936 yards.	1 yard = 0.9144 meter.
1 dekam'r = 1.9884 rods.	1 rod = 0.5029 dekam'r
1 kilom'r = 0.62137 mile.	1 mile = 1.6093 kilom'rs.

Square Measure

1 sq. centim't'r = 0.1550 sq. in.	1 sq. in. = 6.452 square centimeters.
1 sq. decimeter = 0.1076 sq. ft.	1 sq. ft. = 9.2903 square decimeters.
1 sq. meter = 1.96 sq. yd.	1 sq. yd. = 0.8361 sq. m.
1 arc. = 3.954 sq. rd.	1 sq. rd. = 0.2529 arc.
1 hektar = 2.47 acres.	1 acre = 0.4047 hektar.
1 sq. kilometer = 0.386 sq. m.	1 sq. m. = 2.59 sq. kilometers.

Measure of Volume

1 cu. centimeter = 0.061 cu. in.	1 cu. in. = 16.39 cubic centimeters
1 cu. decimeter = 0.0353 cu. ft.	1 cu. ft. = 28.317 cubic decimeters.
1 cu. mr. 1 stere = 1.308 cu. yd 0.2759 cd.	1 cu. yd. = 0.7646 cu. me'r. 1 cord = 3.624 steres.
1 liter = 0.908 qt. dry. 1.0567 qt. liq.	1 qt. dry = 1.101 liters. 1 qt. liq. = 0.9463 liter.
1 dekaliter = 2.6417 gal.	1 gal. = 0.3785 dekaliter.
1 hektoliter = 2.8375 bu.	1 pk. = 0.881 dekaliter. 1 bu. = 0.3524 hektoliter.

Weights

1 gram. = 0.0527 oz.	1 oz. = 28.85 grams.
1 kilogram = 2.2046 lbs.	1 lb. = 0.4536 kilogram.
1 metric ton = 1.1023 English ton.	1 English ton = 0.9072 metric ton.

Approximate Metric Equivalents

1 decimeter = 4 ins.
1 meter = 1.1 yards
1 kilometer = ⅝ mile.
1 hektar = 2½ acres.
1 stere or cu. meter = ¼ of a cord.
1 liter = 1.06 qt. liq. / 0.9 qt. dry.
1 hektoliter = 2⅝ bushel.
1 kilogram = 2⅕ lbs.
1 metric ton = 2,200 lbs.

Useful Information

Table of Effective Fire Streams

Using 100 feet of 2½-inch rubber-lined hose between nozzle and hydrant, or pump.

Size Smooth Nozzle Inches	Pressure Pounds		Stream Ft.		Discharge per Min. Gal.	Size Smooth Nozzle Inches	Pressure Pounds		Stream, Ft.		Discharge per Min. Gal.
	Hydrant	Nozzle	*Effective Vert. Ht.	Horizontal Distance			Hydrant	Nozzle	*Effective Vert. Ht.	Horizontal Distance	
¾	32	30	48	37	90	1⅛	42	30	52	50	206
	43	40	60	44	104		56	40	65	59	238
	54	50	67	50	116		70	50	75	66	266
	65	60	72	54	127		84	60	83	72	291
	75	70	76	58	137		98	70	88	77	314
	86	80	79	62	147		112	80	92	81	336
⅞	34	30	49	42	123	1¼	49	30	53	54	256
	46	40	62	49	142		65	40	67	63	296
	57	50	71	55	159		81	50	77	70	331
	69	60	77	61	174		97	60	85	76	363
	80	70	81	66	188		113	70	91	81	392
	91	80	85	70	201		129	80	95	85	419
1	37	30	51	47	161	1⅜	58	30	55	56	315
	50	40	64	55	186		77	40	69	66	363
	62	50	73	61	208		96	50	79	73	406
	75	60	79	67	228		116	60	87	79	445
	87	70	85	72	246		130	70	92	84	480
	100	80	89	76	263		154	80	97	88	514

Two hundred and fifty gallons per minute is a good standard fire stream with 80 pounds pressure at the hydrant.

*Spray or drops will go from 22 to 56 per cent higher, and from 120 to 150 per cent farther horizontally, but figures given in table are for effective fire streams that will make a black mark where they hit.

Irrigation Table

Discharge In.	Gallons per Minute	Cubic Feet per Second	Number of Acres Irrigated in 12 Hours' Pumping			
			1 In. Deep	2 In. Deep	3 In. Deep	4 In. Deep
1	20	.045	.529	2645	.1765	.1324
1½	50	.11	1.328	.664	.4425	.332
2	100	.22	2.65	1.325	.883	.6625
2½	150	.33	3.98	1.991	1.328	.995
3	225	.50	5.97	2.985	1.99	1.492
4	300	.67	7.96	3.98	2.655	1.99
4	400	.89	10.61	5.305	3.535	2.652
5	700	1.56	18.58	9.28	6.18	4.64
6	900	2.01	23.85	11.95	7.96	5.97
8	1200	2.68	31.82	15.92	10.61	7.95
8	1600	3.57	42.35	21.20	14.15	10.61
10	3000	6.68	79.50	39.75	26.50	19.88
12	4500	10.03	119.30	59.70	39.75	29.85
16	6000	13.36	159.10	79.60	53.00	39.75
16	7000	15.61	185.70	92.80	61.90	46.45
16	8500	18.95	225.50	112.80	75.20	56.35
29	10000	22.25	265.00	132.50	88.30	66.25
20	14000	31.15	371.00	185.50	123.70	92.75

Discharge In.	Gallons per Minute	Cubic Feet per Second	Number of Acres Irrigated in 12 Hours' Pumping			
			6 In. Deep	8 In. Deep	10 In. Deep	12 In. Deep
1	20	.045	.0883	.0663	.0529	.0442
1½	50	.11	.221	.166	.1328	.1105
2	100	.22	.442	.3313	.265	.221
2½	150	.33	.664	.4975	.398	.332
3	225	.50	.994	.747	.597	.4975
4	300	.67	1.327	.995	.796	.663
4	400	.89	1.770	1.328	1.061	.884
5	700	1.56	3.095	2.32	1.858	1.548
6	900	2.01	3.98	2.975	2.385	1.99
8	1200	2.68	5.305	3.975	3.182	2.65
8	1600	3.57	7.075	5.305	4.235	3.535
10	3000	6.68	13.25	9.94	7.95	6.625
12	4500	10.03	19.90	14.93	11.93	9.95
16	6000	13.36	26.52	19.89	15.91	13.26
16	7000	15.61	30.95	23.20	18.57	15.47
16	8500	18.95	37.60	28.19	22.55	18.79
20	10000	22.25	44.20	33.15	26.50	22.10
20	14000	31.15	61.80	46.35	37.10	30.95

Useful Information

For Every Day Use in Engine Room

To find diameter of cylinder for a given power:

Multiply horse power of engine by 33,000; divide product by the product of cylinder × steam pressure × piston speed in feet per minute.

Rule for finding contents in cubic feet of a cylinder of any given diameter:

Multiply the square of diameter in inches by .7854 and this product by length of stroke in inches. Divide last product by 1728, and the result is contents of cylinder in cubic feet.

The diameter of the valve rod should be 1/10 to 1/12 of the cylinder diameter; or from 1/350 to 1/300 of unbalanced area of slide valve. This last is considering the valve as a piston. Steel rods, of course, will bear being made smaller.

Don't depend too much upon the glass gauge but try the cocks often enough to keep your hand in, in telling the height of water by them. If a gauge cock has a tendency to leak, fix it thoroughly; if you do not you will neglect to use it for fear of the work which you may have to stop the leak after using.

Safety valves should be allowed to blow straight out into the room and not hitched on to a leading pipe which may allow water to stand on the valve, increasing its weight, or to freeze up if the boiler is laid up. When the valve blows into the room it will be known, when steam is escaping, whether from leakage or over pressure.

The economy of an engine should always be rated by the amount of steam or water which it consumes per horse power per hour. The amount of coal burned per horse power per hour involves the economy of the whole plant, and is not a measure of the performance of the engine taken independently.

Horizontal engines, when practicable, should be run over rather than under, as the thrust will then come downward upon the foundation rather than upon the caps of the boxes and the upper guides.

In calculating horse powers of steam boilers, consider:

Tubular boilers, 15 square feet of heating surface, equivalent to 1 horse power.

Portable boilers, 12 square feet of heating surface, equivalent to 1 horse power.

Cylinder boilers, 10 square feet of heating surface, equivalent to 1 horse power.

To find the area of safety valve required:

Multiply the number of pounds of coal burned per hour by .045; or the number of pounds of water evaporated per hour by .006. The product is the area of a common valve required in square inches.

Safety Valve Rules

To find the distance, ball should be placed on lever where the weight is known, or to find weight when distance is known:

Multiply pressure required by area of valve, then multiply this answer by the fulcrum, subtract the weight of the lever, valve and stem, and divide by the weight of the ball for distance, or divide by distance for weight of the ball with the same example.

To find the pressure when the area of the valve, the weight of the lever valve and stem, the fulcrum and the weight of the ball is known:

Divide fulcrum into length of lever, multiply the answer by weight of ball, add weight of lever, valve and stem, and divide by area of valve. The answer will be the steam pressure.

The mean effective weight of valve lever and stem is found by connecting a lever at fulcrum, tie the valve stem to lever, attach a spring scale to lever immediately over the valve, and raise until the valve is clear of its seat.

By the fulcrum is meant the distance the valve stem is from where the lever is connected.

For Calculating the Speed of Drums and Pulleys

PROBLEM No. 1.—The diameter of the driver being given, to find its number of revolutions.

RULE.—Multiply the diameter of the driver by number of its revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions of the driven.

PROBLEM No. 2.—The diameter and revolutions of the driver being given to find the diameter of the driven that shall make any given number of revolutions in the same time.

RULE.—Multiply the diameter of the driver by its number of revolutions and divide the product by the number of revolutions of the driven; the quotient will be its diameter.

PROBLEM No. 3.—To ascertain the size of the driver.

RULE.—Multiply the diameter of the driver by the number of revolutions you wish it to make, and divide the product by the revolutions of the driver; the quotient will be the diameter of the driver.

N. B.—In ordering pulleys, be careful to give the exact size of the shaft on which they are to go; also state how you wish them finished on the face—flat face for shifting belt, or rounding for non-shifting.

How to Calculate Speed

To find the speed of a countershaft, if the revolutions of the main shaft and size of pulleys are given: Multiply the revolutions of the main shaft by the diameter in inches of the pulley on the countershaft; the quotient will be the number of revolutions.

EXAMPLE.—What will be the speed of a countershaft with a 12-inch pulley, driven by a 30-inch pulley 180 revolutions per minute? 180×30÷12=450.

To find the size of a pulley required, if the number of revolutions and size of pulley on the main shaft are given: Multiply the diameter in inches of driving pulley by the revolutions of the main shaft, and divide by the speed required; the quotient will be the diameter in inches of the pulley.

EXAMPLE.—What will be the diameter of a pulley to make a countershaft turn 450 revolutions per minute, driven by a 30-inch pulley 180 revolutions per minute?

180×30÷450=12-inch pulley.

To find the size of a pulley for a main shaft, if the speed of shafts, and diameter of the pulley on the countershafts are given: Multiply the diameter in inches of pulley by speed of the countershaft, and divide by the revolutions of the main shaft. The quotient will be the diameter of the pulley.

EXAMPLE.—What will be the diameter of a pulley on a main shaft making 180 revolutions per minute to drive a 12-inch pulley 450 revolutions per minute? 450×12÷180=30-inch pulley.

A gallon of fresh water weighs 8½ pounds, and contains 231 cubic inches.

A cubic foot of water weighs 62½ pounds, and contains 1,728 cubic inches, or 7½ gallons.

Useful Information

Cubic Feet of Free Air Required to Run One Drill of Size and at the Pressure Stated Below

Gauge Pressure	Cylinder Diameter of Drill, Inches						
	2	2¼	2½	2¾	3	3⅛	3 3/16
60	50	60	68	82	90	95	97
70	56	68	77	93	102	108	110
80	63	76	86	104	114	120	123
90	70	84	95	115	126	133	136
100	77	92	104	126	138	146	149

Gauge Pressure	Cylinder Diameter of Drill, Inches						
	3¼	3½	3⅝	4¾	5	5½	....
60	100	108	113	130	150	164	...
70	113	124	129	147	170	181	...
80	127	131	143	164	190	207	...
90	141	152	159	182	210	230	...
100	154	166	174	199	240	252	...

Multipliers to Determine Capacity of Compressor Required to Operate from 1 to 70 Rock Drills at Altitudes Compared with Sea Level

Altitude Above Sea Level	Number of Drills									
	1	2	3	4	5	6	7	8	9	10
	Multipliers									
0	1.	1.8	2.7	3.4	4.1	4.8	5.4	6.	6.5	7.1
1000	1.03	1.85	2.78	3.5	4.22	4.94	5.56	6.18	6.69	7.3
2000	1.07	1.92	2.89	3.64	4.39	5.14	5.78	6.42	6.95	7.6
3000	1.10	1.98	2.97	3.74	4.51	5.28	5.94	6.6	7.15	7.81
4000	1.14	2.05	3.08	3.88	4.67	5.47	6.15	6.84	7.41	8.09
5000	1.17	2.10	3.16	3.98	4.8	5.62	6.32	7.02	7.61	8.31
6000	1.20	2.16	3.24	4.08	4.9	5.76	6.48	7.2	7.8	8.52
7000	1.23	2.21	3.32	4.18	5.04	5.9	6.64	7.38	7.99	8.73
8000	1.26	2.27	3.4	4.28	5.17	6.05	6.8	7.56	8.19	8.95
9000	1.29	2.32	3.48	4.39	5.29	6.19	6.96	7.74	8.38	9.16
10000	1.32	2.38	3.56	4.49	5.41	6.34	7.13	7.92	8.58	9.37
12000	1.37	2.47	3.7	4.66	5.62	6.57	7.4	8.22	8.9	9.73
15000	1.43	2.57	3.86	4.86	5.86	6.86	7.72	8.58	9.3	10.15

Altitude Above Sea Level	Number of Drills								
	12	15	20	25	30	40	50	60	70
	Multipliers								
0	8.1	9.5	11.7	13.7	15.8	21.4	25.5	29.4	33.2
1000	8.34	9.78	12.05	14.1	16.3	22.	26.26	30.3	34.2
2000	8.67	10.17	12.52	14.66	16.9	22.9	27.28	31.46	35.52
3000	8.91	10.45	12.87	15.07	17.38	23.54	28.05	32.34	36.52
4000	9.23	10.83	13.34	15.62	18.01	24.4	29.07	33.52	37.8
5000	9.48	11.12	13.69	16.03	18.49	25.04	29.84	34.4	38.84
6000	9.72	11.4	14.04	16.44	18.96	25.68	30.6	35.4	39.84
7000	9.96	11.68	14.39	16.85	19.43	26.32	31.36	36.16	40.84
8000	10.21	11.97	14.74	17.26	19.9	26.96	32.13	37.04	41.83
9000	10.45	12.26	15.09	17.67	20.38	27.6	32.9	37.92	42.83
10000	10.69	12.54	15.44	18.08	20.86	28.25	33.66	38.8	43.82
12000	11.1	13.02	16.03	18.77	21.64	29.32	34.94	40.28	45.48
15000	11.58	13.58	16.73	19.59	22.59	30.6	36.46	42.04	47.47

Table of Branch Pipes Relative Carrying Capacity of Pipes for Air

Diam. Pipe, In.	Diameter Pipe, Inches						
	1	1¼	1½	2	2½	3	3½	4
1	1.00	.52	.327	.15	.084	.05	.....	.....
1¼	1.90	1.00	.614	.28	.16	.10	.066	.....
1½	3.05	1.60	1.00	.46	.256	.16	.106	.075
2	6.55	3.45	2.14	1.00	.56	.34	.23	.160
2½	11.8	6.25	3.88	1.81	1.00	.614	.41	.29
3	19.0	12.0	6.32	2.95	1.63	1.00	.67	.47
3½	.....	15.2	9.45	4.3	2.43	1.50	1.00	.71
4	.....	21.6	13.4	6.25	3.46	2.10	1.42	1.00
4½	.....	.....	18.0	8.30	4.65	2.85	1.90	1.35
5	.....	.....	......	....	6.14	3.77	2.60	1.78
6	.....	.....	......	....	.....	6.05	4.00	2.85
7	.....	.....	......	....	.....	.....	6.00	4.20
8	.....	.....	......	....	.....	.....	.....	6.00

Diam. Pipe, In.	Diameter Pipe, Inches						
	4½	5	6	7	8	10	12	....
2	.12	....	.....	.....	.....	.....	....	....
2½	.216	.163	.....	.....	.....	.....	....	....
3	.35	.268	.165	.....	.....	.....	....	....
3½	.52	.400	.246	.166	.....	.....	....	....
4	.75	.56	.352	.237	.169	.....	....	....
4½	1.00	.76	.475	.32	.227	.128	....	....
5	1.32	1.00	.625	.42	.30	.169	.10	....
6	2.15	1.60	1.00	.675	.48	.27	.17	....
7	3.16	2.37	1.48	1.00	.71	.40	.25	....
8	4.40	3.25	2.10	1.40	1.00	.56	.35	....
10	7.85	5.90	3.70	2.50	1.77	1.00	.63	....
12	.....	9.40	5.90	3.95	2.80	1.60	1.00	....

Useful Information

Wrought Iron and Steel Pipe

Safe Working Pressures

Numerous factory tests to determine the actual bursting pressure of wrought pipe have proved Barlow's formula to be correct. This formula follows:

$$P = 2f\frac{t}{D}$$

in which P equals bursting pressure in pounds per square inch.

t equals thickness of the wall in inches.
D equals outside diameter of the pipe in inches.
f equals fiber stress in pounds per square inch.

The value of f was determined from actual tests to be 40000 pounds per square inch for butt welded steel pipe and 50000 pounds for lap welded steel pipe.

The table following is based on the formula given above. The working pressures given are based on a factor of safety of eight.

Theoretical Bursting and Working Pressures Pounds per Square Inch

	Standard			**Extra Strong**		
Size In.	Thickness	Bursting Pressure Barlow's Formula	Working Pressure Factor 8	Thickness	Bursting Pressure Barlow's Formula	Working Pressure Factor 8
⅛	.068	13432	1679	095	18765	2346
¼	.088	13037	1630	.119	17630	2204
⅜	.091	10785	1348	.126	14933	1867
½	.109	10381	1298	.147	14000	1750
¾	.113	8610	1076	.154	11733	1467
1	.133	8091	1011	.179	10890	1361
1¼	.140	6747	843	.191	9205	1151
1½	.145	6105	763	.200	8421	1053
2	.154	5187	648	.218	7343	918
2½	.203	5649	706	.276	7680	960
3	.216	4937	617	.300	6857	857
3½	.226	5650	706	.318	7950	994
4	.237	5267	658	.337	7489	936
4½	.247	4940	618	.355	7100	888
5	.258	4638	580	.375	6741	843
6	.280	4226	528	.432	6521	815
7	.301	3948	493	.500	6557	820
8	.277	3212	401	....	....	...
8	.322	3733	467	.500	5797	725
9	.342	3553	444	.500	5195	649
10	.279	2595	324	....	....	...
10	.307	2856	357	....	....	...
10	.365	3395	424	.500	4651	581
11	.375	3191	399	.500	4255	532
12	.330	2588	324	....	....	...
12	.375	2941	368	.500	3922	490
14 O.D.	.375	2679	335	....	....	...
15 O.D.	.375	2500	313	....	....	...
16 O.D.	.375	2344	293	....	....	...
17 O.D.	.393	2312	289	....	....	...
18 O.D.	.409	2272	284	....	....	...
20 O.D.	.409	2045	256	....	....	...

	Double Extra Strong						
Size In.	Thickness	Bursting Pressure Barlow's Formula	Working Pressure Factor 8	Size In.	Thickness	Bursting Pressure Barlow's Formula	Working Pressure Factor 8
½	.294	28000	3500	**3½**	.636	15900	1988
¾	.308	23467	2933	**4**	.674	14978	1872
1	.358	21779	2722	**4½**	.710	14200	1775
1¼	.382	18410	2301	**5**	.750	13482	1685
1½	.400	16842	2105	**6**	.864	13042	1630
2	.436	14686	1836	**7**	.875	11475	1434
2½	.552	15360	1920	**8**	.875	10145	1268
3	.600	17143	2143	...	....	.....	....

In the above table, butt welded pipe was figured on sizes 3-inch and smaller and lap welded pipe size 3½-inch and larger.

Useful Information

No. of U. S. Gallons in Round Tank for One Foot in Depth

Diameter of Tank Ft.	In.	Capacity U. S. Gallons	Cu. Ft. and Area Sq. Ft.	Diameter of Tank Ft.	In.	Capacity U. S. Gallons	Cu. Ft. and Area Sq. Ft.
1	..	5.87	.785	9	..	475.89	63.62
1	1	6.89	.922	9	3	502.70	67.20
1	2	8.	1.069	9	6	530.24	70.88
1	3	9.18	1.227	9	9	558.51	74.66
1	4	10.44	1.396	10	..	587.52	78.54
1	5	11.79	1.576	10	3	617.26	82.52
1	6	13.22	1.767	10	6	640.74	86.59
1	7	14.73	1.969	10	9	678.95	90.76
1	8	16.32	2.182	11	..	710.90	95.03
1	9	17.99	2.405	11	3	743.58	99.40
1	10	19.75	2.640	11	6	776.99	103.87
1	11	21.58	2.885	11	9	811.14	108.43
2	..	23.50	3.142	12	..	846.03	113.10
2	1	25.50	3.409	12	3	881.65	117.86
2	2	27.58	3.687	12	6	918.	122.72
2	3	29.74	3.976	12	9	955.09	127.68
2	4	31.99	4.276	13	..	992.91	132.73
2	5	34.31	4.587	13	3	1031.5	137.89
2	6	36.72	4.909	13	6	1070.8	143.14
2	7	39.21	5.241	13	9	1110.8	148.49
2	8	41.78	5.585	14	..	1151.5	153.94
2	9	44.43	5.940	14	3	1193.	159.48
2	10	47.16	6.305	14	6	1235.3	165.13
2	11	49.98	6.681	14	9	1278.2	170.87
3	..	52.88	7.069	15	..	1321.9	176.71
3	1	55.86	7.467	15	3	1366.4	182.65
3	2	58.92	7.876	15	6	1411.5	188.69
3	3	62.06	8.296	15	9	1457.4	194.83
3	4	65.28	8.727	16	..	1504.1	201.06
3	5	68.58	9.168	16	3	1551.4	207.39
3	6	71.97	9.621	16	6	1599.5	213.82
3	7	75.44	10.085	16	9	1648.4	220.35
3	8	78.99	10.559	17	..	1697.9	226.98
3	9	82.62	11.045	17	3	1748.2	233.71
3	10	86.33	11.541	17	6	1799.3	240.53
3	11	90.13	12.048	17	9	1851.1	247.45
4	..	94.	12.566	18	..	1903.6	254.47
4	1	97.96	13.095	18	3	1956.8	261.59
4	2	102.	13.635	18	6	2010.8	268.80
4	3	106.12	14.186	18	9	2065.5	276.12
4	4	110.32	14.748	19	..	2120.9	283.53
4	5	114.61	15.321	19	3	2177.1	291.04
4	6	118.97	15.90	19	6	2234.	298.65
4	7	123.42	16.50	19	9	2291.7	306.35
4	8	127.95	17.10	20	..	2350.1	314.16
4	9	132.56	17.72	20	3	2409.2	322.06
4	10	137.25	18.35	20	6	2469.1	330.06
4	11	142.02	18.99	20	9	2529.6	338.16
5	..	146.88	19.63	21	..	2591.	346.36
5	1	151.82	20.29	21	3	2653.	354.66
5	2	156.83	20.97	21	6	2715.8	363.05
5	3	161.93	21.65	21	9	2779.3	371.54
5	4	167.12	22.34	22	..	2843.6	380.13
5	5	172.38	23.04	22	3	2908.6	388.82
5	6	177.72	23.76	22	6	2974.3	397.61
5	7	183.15	24.48	22	9	3040.8	406.49
5	8	188.66	25.22	23	..	3108.	415.48
5	9	194.25	25.97	23	3	3175.9	424.56
5	10	199.92	26.73	23	6	3244.6	433.74
5	11	205.67	27.49	23	9	3314.	443.01
6	..	211.51	28.27	24	..	3384.1	452.39
6	3	229.50	30.68	24	3	3455.	461.86
6	6	248.23	33.18	24	6	3526.6	471.44
6	9	267.69	35.78	24	9	3598.9	481.11
7	..	287.88	38.48	25	..	3672.	490.87
7	3	308.81	41.28	25	3	3745.8	500.74
7	6	330.48	44.18	25	6	3820.3	510.71
7	9	352.88	47.17	25	9	3895.6	520.77
8	..	376.01	50.27	26	..	3971.6	530.93
8	3	399.88	53.46	26	3	4048.4	541.19
8	6	424.48	56.75	26	6	4125.9	551.55
8	9	449.82	60.13	26	9	4204.1	562.

To find the capacity of tanks larger than given in the table, set table for tank one-half of the given size, and multiply its capacity by 4, or one of one-third its size and multiply by 9, etc. Thirty-one and one-half gallons equal one barrel. To find the capacity of a square tank, find the capacity of a round tank with diameter same as length of side, and divide by .7854. A 10-foot diameter round tank, 1 foot high, holds 587.52 gallons. A square tank 10x10 feet by 1 foot high equals 587.52 divided by .7854 equals 748 gallons.

Rope Pull and H.P. Required to Pull One Ton (2000 Pounds) on Inclines

An Allowance for Friction and Other Contingencies Being Made

Per Cent of Grade	Rope Pull Lbs.	Rope Speed, Feet per Minute 100	200	300	400	500	600
1	60	.22	.45	.68	.90	1.12	1.35
2	80	.30	.60	.90	1.20	1.51	1.81
3	100	.37	.75	1.12	1.50	1.87	2.25
4	120	.45	.91	1.36	1.81	2.25	2.70
5	140	.53	1.06	1.59	2.12	2.65	3.18
6	160	.60	1.20	1.80	2.40	3.00	3.60
7	180	.68	1.36	2.04	2.72	3.40	4.08
8	200	.75	1.51	2.27	3.02	3.78	4.54
9	219	.82	1.65	2.48	3.30	4.13	4.97
10	239	.90	1.80	2.70	3.61	4.52	5.42
11	259	.98	1.96	2.94	3.92	4.90	5.88
12	278	1.05	2.10	3.15	4.20	5.25	6.30
13	298	1.13	2.26	3.39	4.51	5.63	6.76
14	318	1.20	2.40	3.61	4.81	6.02	7.22
15	337	1.27	2.55	3.82	5.10	6.37	7.65
16	356	1.34	2.69	4.04	5.39	6.74	8.09
17	375	1.42	2.84	4.26	5.68	7.10	8.52
18	395	1.49	2.98	4.48	5.97	7.47	8.97
19	414	1.56	3.13	4.70	6.27	7.84	9.40
20	432	1.63	3.26	4.90	6.54	8.18	9.81
21	451	1.70	3.41	5.12	6.82	8.53	10.24
22	470	1.77	3.55	5.33	7.10	8.89	10.67
23	489	1.85	3.70	5.55	7.40	9.25	11.10
24	507	1.92	3.84	5.75	7.67	9.59	11.50
25	525	1.99	3.97	5.96	7.94	9.93	11.92
26	543	2.05	4.11	6.16	8.22	10.28	12.34
27	561	2.12	4.24	6.36	8.48	10.60	12.72
28	579	2.19	4.38	6.57	8.76	10.95	13.14
29	597	2.25	4.50	6.75	9.00	11.25	13.50
30	615	2.32	4.64	6.96	9.28	11.60	13.92
31	632	2.39	4.78	7.17	9.56	11.95	14.34
32	650	2.46	4.92	7.38	9.84	12.30	14.76
33	667	2.52	5.04	7.56	10.08	12.60	15.12
34	684	2.58	5.16	7.74	10.32	12.90	15.48
35	701	2.65	5.30	7.95	10.60	13.25	15.90
36	717	2.71	5.42	8.13	10.84	13.55	16.26
37	734	2.77	5.54	8.31	11.08	13.85	16.62
38	751	2.84	5.68	8.52	11.36	14.20	17.04
39	767	2.90	5.80	8.70	11.60	14.50	17.40
40	783	2.96	5.92	8.88	11.84	14.80	17.76
41	799	3.02	6.04	9.06	12.08	15.10	18.12
42	815	3.08	6.16	9.24	12.32	15.40	18.48
43	830	3.14	6.28	9.42	12.56	15.70	18.84
44	845	3.20	6.40	9.60	12.80	16.00	19.20
45	860	3.25	6.50	9.75	13.00	16.25	19.50
46	876	3.31	6.62	9.93	13.24	16.55	19.86
47	891	3.37	6.74	10.11	13.48	16.85	20.22
48	906	3.43	6.86	10.29	13.72	17.15	20.58
49	920	3.48	6.96	10.44	13.92	17.40	20.88
50	934	3.54	7.08	10.62	14.16	17.70	21.24
51	949	3.59	7.18	10.77	14.36	17.95	21.54
52	963	3.64	7.28	10.92	14.56	18.20	21.84
53	977	3.70	7.40	11.10	14.80	18.50	22.20
54	991	3.75	7.50	11.25	15.00	18.75	22.50
55	1004	3.80	7.60	11.40	15.20	19.00	22.80
56	1017	3.85	7.70	11.55	15.40	19.25	23.10
57	1030	3.90	7.80	11.70	15.60	19.50	23.40
58	1043	3.95	7.90	11.85	15.80	19.75	23.70
59	1056	4.00	8.00	12.00	16.00	20.00	24.00
60	1069	4.05	8.10	12.15	16.20	20.25	24.30
61	1081	4.09	8.18	12.27	16.36	20.46	24.54
62	1094	4.14	8.28	12.42	16.56	20.70	24.84
63	1106	4.19	8.38	12.57	16.76	20.95	25.14
64	1118	4.24	8.48	12.72	16.96	21.20	25.44

Sizes of Tap Drills for U. S. Standard Threads

By the formulas given below, the results, strictly speaking, are the diameters of the bottoms of the threads. The tap drill is, in common practice, the one that is one or two-gauge numbers larger, for the smaller or numbered sizes, and one that is about .005 inch larger for the larger sizes. The amount allowed for clearance varies in different shops and on different classes of work.

Size of Tap Drill for U. S. Standard Thread =

$$\text{outside diameter of screw}\quad \frac{1.299}{\text{Threads to the inch.}}$$

Size of Tap Drill for ¾-inch screw, U. S. Standard Thread, 10 threads to the inch =

$$.750\quad \frac{1.299}{10} = .750 — .1299 = .6201, \text{ size of Tap Drill.}$$

Diam. Screw In.	Threads per In.	Size Tap Drill In.	Diam. Screw In.	Threads per In.	Size Tap Drill In.	Diam. Screw In.	Threads per In.	Size Tap Drill In.
¼	20	.185	1⅜	6	1.160	3½	3¼	3.100
5/16	18	.240	1½	6	1.284	3¾	3	3.317
⅜	16	.294	1⅝	5½	1.389	4	3	3.567
7/16	14	.344	1¾	5	1.491	4¼	2⅞	3.798
½	13	.400	1⅞	5	1.616	4½	2¾	4.028
9/16	12	.454	2	4½	1.712	4¾	2⅝	4.256
⅝	11	.507	2¼	4½	1.962	5	2½	4.480
¾	10	.620	2½	4	2.176	5¼	2½	4.730
⅞	9	.731	2¾	4	2.426	5½	2⅜	4.953
1	8	.837	3	3½	2.629	5¾	2⅜	5.203
1⅛	7	.940	3¼	3½	2.879	6	2¼	5.423
1¼	7	1.065	...	...	.....	...	...	.....

Pipe Tap Drills

Size In.	No. Threads to In.	Diam. Drill In.	Size In.	No. Threads to In.	Diam. Drill In.	Size In.	No. Threads to In.	Diam. Drill In.
⅛	27	21/64	1	11½	1 3/16	2½	8	2 11/16
¼	18	29/64	1¼	11½	1 15/32	3	8	3 5/16
⅜	18	19/32	1½	11½	1 23/64	3½	8	3 13/16
½	14	23/32	2	11½	2 3/16	4	8	4 5/16
¾	14	15/16	...	....	...	...	..	...

Useful Information

Suggestions for Use of Chain-Belting

Always lubricate chain-belting, using heavy oil or grease. Where the chain is exposed to much grit and dirt, plumbago or graphite grease is found the most suitable. The chain should be run with the back of the coupling hook to the wheel. Where chains are used only as driving chains, run the hook end of the link first. For elevator and conveyor chains, it is considered better practice to run the link with the bar end first, except in cases where the material handled is of gritty character, and might get into the chain joint. In this case run the hook end first.

The chain should run slightly looser than is customary with flat belts. The chain should only be tight enough so that there is no undesirable flapping or jumping.

Do not expect the chain to carry, as a working load, the average ultimate strength. The average ultimate strength is the average breaking load of the chain, as determined through a series of tests. The working load should be from ⅙ to 1/20 of the average ultimate strength, depending on the speed at which the chain is to run, and the character of the service.

For chains used as drive chains, the working load should not exceed the following:

Speed of Chain, Ft. per Min.	Divide Aver. Ult. Strength by Factor	Speed of Chain, Ft. per Min.	Divide Aver. Ult. Strength by Factor
200 and under	6	400 to 500	12
200 to 300	8	500 " 600	16
300 " 400	10	600 " 700	20

Example: The average ultimate strength of No. 88 Chain is 5,750 pounds. Its working load at 200 feet per minute should not exceed 960 pounds—at 400 feet per minute, 575 pounds—at 700 feet per minute, 278 pounds.

Where the load to be transmitted is irregular or subject to shock, a still further reduction in the working load should be made. With elevators carrying material which is liable to choke up, allowance must be made for this fact in designing.

Useful Information

Horse Power and Strength of Shafting

The determination of proper shaft sizes for power transmission involves factors in addition to those of speed and horse power. The effect of the distance between bearings, the amount and direction of strains, due to the pull of belt or chain, as well as torsional strain and the weight of sprockets, gears and pulleys, should all be taken into account. For instance, a shaft may have sufficient strength to transmit a given amount of power without exceeding allowable fibre stresses, yet may deflect too much under the load imposed.

Therefore, plain horse power tables at various speeds must be limited to cases where the bending moments are kept low by supporting the shaft by bearings close to the sprockets, gears, pulleys, etc.

The use of hammered steel, which is more expensive than the standard, permits the transmission of about 20 per cent more power for the same diameter of cold drawn shafting.

Horse Power Transmitted by Cold Drawn Shafting

H. P. = Horse Power D = Diameter in inches
R = R. P. M.

For Simple Transmission of Power with No Bending Strains

$$\text{H. P.} = \frac{D^3 R}{50}$$

Diam. Shaft In.	Revolutions per Minute 50	100	150	200	250	300	400	500
15/16	1	1.5	2.5	3	4	5	6.5	8
1 3/16	1.5	3	5	7	8	10	13	17
1 7/16	3	6	9	12	15	18	24	30
1 11/16	5	10	14	19	24	29	38	48
1 15/16	7	15	22	29	36	44	58	73
2 3/16	10	21	31	42	52	63	84	105
2 7/16	14	29	43	58	72	87	116	145
2 11/16	19	39	58	78	97	116	155	194
2 15/16	25	51	76	101	127	152	202	253
3 7/16	41	81	122	163	203	244	325	406
3 15/16	61	122	183	244	305	367	489	610
4 7/16	87	175	262	350	437	524	699	...
4 15/16	120	241	361	482	602	722	963	...
5 7/16	161	322	483	644	805	966	...	...
6	216	432	648	864	1080	1296	...	...
6½	275	549	824	1099	1373	....	...	...
7	343	686	1029	1372	1715	....	...	...
7½	422	844	1266	1688	....	....	...	...
8	512	1024	1536	2048	....	....	...	...

For Line Shafts with Bearings Every 8 Feet

$$\text{H. P.} = \frac{D^3 R}{75}$$

Diam. Shaft In.	Revolutions per Minute 50	100	150	200	250	300	400	500
1 3/16	1	2	3	4	6	7	9	11
1 7/16	2	4	6	8	10	12	16	20
1 11/16	3	6	10	13	16	19	26	32
1 15/16	5	10	15	19	24	29	39	49
2 3/16	7	14	21	28	35	42	56	70
2 7/16	10	19	29	39	48	58	77	96
2 11/16	13	26	39	52	65	78	104	130
2 15/16	17	34	51	68	85	101	135	169
3 7/16	27	54	81	108	135	162	216	270
3 15/16	41	82	122	163	204	244	326	407
4 7/16	58	117	175	233	291	350	466	...
4 15/16	80	160	240	320	400	480	640	...
5 7/16	107	215	322	429	536	645	...	...
6	144	288	432	576	720	...	...	...
6½	183	366	550	733	917	...	...	...
7	229	457	686	915	1143	...	...	...
7½	284	568	852	1136	....	...	...	...
8	341	682	1023	1364	....	...	...	...

For Head Shafts, Heavy Strains, Shafts with Gears, etc., which are Closely Supported by Bearings

$$\text{H. P.} = \frac{D^3 R}{125}$$

Diam. Shaft In.	Revolutions per Minute 10	20	30	40	50	100
1 3/16	.1	.3	.4	.5	.7	1.3
1 7/16	.2	.5	.7	1.0	1.2	2.4
1 11/16	.4	.8	1.2	1.5	1.9	3.8
1 15/16	.6	1.2	1.7	2.3	2.9	5.8
2 3/16	.8	1.7	2.5	3	4	8
2 7/16	1.2	2	3	5	6	12
2 11/16	1.6	3	5	6	8	16
2 15/16	2	4	6	8	10	20
3 7/16	3	6	10	13	16	32
3 15/16	5	10	15	19	24	48
4 7/16	7	14	21	28	35	70
4 15/16	10	19	29	38	48	96
5 7/16	13	26	39	52	65	129
6	17	35	52	69	86	173
6½	22	44	66	88	110	220
7	27	55	82	110	137	274
7½	34	68	102	136	170	340
8	41	82	123	164	205	410

The above horse power values are derived from the purely empirical formulas given above. In many factory installations it is impossible to determine the amounts and position of the loads causing bending and twisting as well as probabilities that additional pulleys will be used. The formulas take some of these factors into consideration.

To determine exactly the size of shaft necessary, with known conditions, both bending and torsional strains should be calculated, particularly for heavy loads at slow speeds.

Useful Information

Water

1 cubic inch weighs .0361 pounds.

1 pound = 27.7 cubic inches.

1 cubic foot = 62.4245 pounds at 39° F.; 7.48 gallons U.S.; 6.2321 gallons Imperial.

1 gallon U.S. = 8.355 pounds; 231 cubic inches; .113368 cubic feet.

1 Imperial gallon = 10 pounds at 62° F.; 277.274 cubic inches; .16046 cubic feet.

1 pound pressure = 2.31 feet in height.

1 foot in height = .433 pounds pressure.

Petroleum weighs 6½ pounds per U. S. gallon, 42 gallons to the barrel.

To convert Imperial gallons into U. S. gallons, multiply by the factor 1.2. To convert U. S. gallons into Imperial gallons, multiply by the factor .8333.

A miner's inch is a measure for flow of water, and is the quantity of water that will flow in one minute through an opening 1 inch square in a plank 2 inches thick under a head of 6½ inches to the center of the orifice. This is equivalent, approximately, to 1.53 cubic feet, or 11½ gallons per minute.

To find the diameter of pump plungers to a pump a given quantity of water at 100 feet piston speed per minute, divide the number of gallons by 4, then extract the square root and the result will be the diameter in inches of the plunger.

To find the number of gallons delivered per minute by a single double-acting pump at 100 feet piston speed per minute, square the diameters of the plungers then multiply by 4.

To find the horsepower necessary to elevate water to a given height, multiply the weight of the water elevated per minute by the height in feet and divide the product by 33000 (an allowance should be made for water friction and a further allowance for losses in the steam cylinder, say from 20 to 30 per cent).

The mean pressure of the atmosphere is usually estimated at 14.4 pounds per square inch, so that with a perfect vacuum it will sustain a column of mercury 29.9 inches, or a column of water 33.9 feet high at sea level.

To determine the proportion between the steam and the pump cylinder, multiply the given area of the pump cylinder by resistance on the pump in pounds per square inch and divide the product by the available pressure of steam in pounds per square inch. The product equals the area of the steam cylinder. To this must be added an extra area to overcome the friction, which is usually taken at 25 per cent.

The resistance of friction in the flow of water through pipes of uniform diameters is independent of the pressure and increases directly as the length and square of the velocity of the flow, and inversely as the diameter of the pipe. With wooden pipes the friction is 2.75 times greater than in metallic. Doubling the diameter increases the capacity 4 times.

To determine the velocity in feet per minute necessary to discharge a given volume of water in a given time, multiply the number of cubic feet of water by 144 and divide the product by the area of the pipe in inches.

To determine the area of a required pipe, the volume and velocity of water being given, multiply the number of cubic feet of water by 144 and divide the product by the velocity in feet per minute.

Water Required per Minute to Feed Boilers

Using the Centennial Standard 30 pounds or 3.6 gallons of water per h.p. per hour, evaporated from 100° Fahrenheit to 70 pounds steam pressure per square inch.

H.P. Boiler	Feed Water Gal.	H.P. Boiler	Feed Water Gal.	H.P. Boiler	Feed Water Gal.	H.P. Boiler	Feed Water Gal.	H.P. Boiler	Feed Water Gal.
20	1.2	**60**	3.6	**110**	6.6	**190**	11.4	**400**	24.0
25	1.5	**65**	3.9	**120**	7.2	**200**	12.0	**450**	27.0
30	1.8	**70**	4.2	**130**	7.8	**225**	13.5	**500**	30.0
35	2.1	**75**	4.5	**140**	8.4	**250**	15.0	**600**	36.0
40	2.4	**80**	4.8	**150**	9.0	**275**	16.5	**700**	42.0
45	2.7	**85**	5.1	**160**	9.6	**300**	18.0	**800**	48.6
50	3.0	**90**	5.4	**170**	10.2	**325**	19.5	**900**	54.0
55	3.3	**100**	6.0	**180**	10.8	**350**	21.0	**1000**	60.0

Useful Information

Miscellaneous

To find the diameter of a circle multiply the circumference by .31831.

To find the circumference of a circle multiply the diameter by 3.1416.

To find the area of a circle multiply the square of the diameter by .7854.

To find the surface of a ball multiply the square of the diameter by 3.1416.

To find the side of an equal square multiply the diameter by .8862.

To find the cubic inches in a ball multiply the cube of the diameter by .5236.

To double the diameter of a pipe increases its capacity four times.

Double riveting is from 16 to 20 per cent stronger than single.

One cubic foot of anthracite coal weighs about 53 pounds.

One cubic foot of bituminous coal weighs from 47 to 50 pounds.

One ton of coal is equivalent to two cords of wood for steam purposes.

A gallon of water (U. S. standard) weighs 8⅓ pounds and contains 231 cubic inches.

A cubic foot of water contains 7½ gallons, 1728 cubic inches, and weighs 62½ pounds.

To sharpen dull files lay them in dilute sulphuric acid until they are eaten deep enough.

A horse power is equivalent to raising 33,000 pounds 1 foot per minute or 550 pounds 1 foot per second.

To find the pressure in pounds per square inch of a column of water multiply the height of the column in feet by .434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 pounds to the square inch).

To evaporate 1 cubic foot of water requires the consumption of 7½ pounds of ordinary coal or about 1 pound of coal to 1 gallon of water.

One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For square marine boilers add 20 per cent for drilled holes.

No plate or bars of either steel or iron should be worked at a black or blue heat (say about 500 degrees); the material will stand far more strain either red hot or cold, while at an intermediate point great risk will be run, and possible strains produced which result in rupture later on.

A miner's inch of water is approximately equal to a supply of 12 U. S. gallons per minute.

The mean pressure of the atmosphere is estimated at 14.7 pounds per square inch, so that with a perfect vacuum it will sustain a column of water 33.9 feet high.

A cubic inch of water evaporated under atmospheric pressure is approximately converted into 1 cubic foot of steam.

The horse power of boilers, as per standard adopted by the Am. S. M. E. is 30 pounds water evaporated per hour at a pressure of 70 pounds per square inch and from a temperature of 100 degrees Fahrenheit.

Well designed boilers, under successful operation, will evaporate from 7 to 10 pounds of water per pound of first-class coal.

Each square foot of heating surface is considered sufficient to evaporate 2 pounds of water; therefore, for an engine using 30 pounds water per horse power per hour, each horse power of the engine requires 15 square feet heating surface in the boiler.

On one square foot of fire grate can be burned on an average from 10 to 12 pounds hard coal, or 18 to 20 pounds soft coal, per hour, with natural draft.

Two and one-quarter pounds of dry wood is equal to 1 pound of average quality soft coal.

There is a saving of about 1 per cent in fuel burned for every 11 degrees feed water that is warmed. With sufficient exhaust steam available, if cold water at 70 degrees is raised to 210 degrees Fahrenheit, the saving of fuel will approximate 12 per cent.

Designers of steam piping figure on a steam travel of about a mile and a half per minute. Very often it is much more than this.

The friction of water in pipes is as the square of velocity.

The capacity of pipes is as the square of their diameters; thus doubling the diameter of a pipe increases its capacity four times.

The height of a column of fresh water, equal to a pressure of one pound per square inch, is 2.31 feet. (In usual computation this is taken at 2 feet, thus allowing for ordinary friction.)

To find the capacity of a cylinder, in gallons: Multiply the area in inches by the length of stroke in inches, will give the total amount of cubic inches; divide this amount by 231 (the cubical contents of a U. S. gallon in inches) and the product is the capacity in gallons.

Domestic Parcel Post Rates

Effective October 1, 1935

Fourth-class (Parcel Post): All matter weighing over 8 ounces (excepting first and second class).

Limit of Size. Parcels must not exceed in size 100 inches in length and girth combined. On parcels measuring more than 84 inches but not more than 100 inches in length and girth combined the minimum charge shall be the rate for a 10-pound parcel.

Wt. Lbs.	Local Rate	1st Zone 50 Miles Rate	2d Zone 50 to 150 Miles Rate	3d Zone 151 to 300 Miles Rate	4th Zone 301 to 600 Miles Rate	5th Zone 601 to 1000 Miles Rate	6th Zone 1001 to 1400 Miles Rate	7th Zone 1401 to 1800 Miles Rate	8th Zone All Over 1800 Miles Rate
1	$.07	$.08	$.08	$.09	$.10	$.11	$.12	$.14	$.15
2	.08	.10	.10	.11	.14	.17	.19	.23	.26
3	.08	.11	.11	.13	.17	.22	.26	.32	.37
4	.09	.12	.12	.15	.21	.27	.33	.41	.48
5	.09	.13	.13	.17	.24	.33	.40	.50	.59
6	.10	.14	.14	.19	.28	.38	.47	.59	.70
7	.10	.15	.15	.21	.31	.43	.54	.68	.81
8	.11	.16	.16	.23	.35	.49	.61	.77	.92
9	.11	.17	.17	.25	.38	.54	.68	.86	1.03
10	.12	.18	.18	.27	.42	.59	.75	.95	1.14
11	.12	.19	.19	.29	.45	.64	.82	1.04	1.25
12	.13	.21	.21	.31	.49	.70	.89	1.13	1.36
13	.13	.22	.22	.33	.52	.75	.96	1.22	1.47
14	.14	.23	.23	.35	.56	.80	1.03	1.31	1.58
15	.14	.24	.24	.37	.59	.86	1.10	1.40	1.69
16	.15	.25	.25	.39	.63	.91	1.17	1.49	1.80
17	.15	.26	.26	.41	.66	.96	1.24	1.58	1.91
18	.16	.27	.27	.43	.70	1.02	1.31	1.67	2.02
19	.16	.28	.28	.45	.73	1.07	1.38	1.76	2.13
20	.17	.29	.29	.47	.77	1.12	1.45	1.85	2.24
21	.17	.30	.30	.49	.80	1.17	1.52	1.94	2.35
22	.18	.32	.32	.51	.84	1.23	1.59	2.03	2.46
23	.18	.33	.33	.53	.87	1.28	1.66	2.12	2.57
24	.19	.34	.34	.55	.91	1.33	1.73	2.21	2.68
25	.19	.35	.35	.57	.94	1.39	1.80	2.30	2.79
26	.20	.36	.36	.59	.98	1.44	1.87	2.39	2.90
27	.20	.37	.37	.61	1.01	1.49	1.94	2.48	3.01
28	.21	.38	.38	.63	1.05	1.55	2.01	2.57	3.12
29	.21	.39	.39	.65	1.08	1.60	2.08	2.66	3.23
30	.22	.40	.40	.67	1.12	1.65	2.15	2.75	3.34
31	.22	.41	.41	.69	1.15	1.70	2.22	2.84	3.45
32	.23	.43	.43	.71	1.19	1.76	2.29	2.93	3.56
33	.23	.44	.44	.73	1.22	1.81	2.36	3.02	3.67
34	.24	.45	.45	.75	1.26	1.86	2.43	3.11	3.78
35	.24	.46	.46	.77	1.29	1.92	2.50	3.20	3.89
36	.25	.47	.47	.79	1.33	1.97	2.57	3.29	4.00
37	.25	.48	.48	.81	1.36	2.02	2.64	3.38	4.11
38	.26	.49	.49	.83	1.40	2.08	2.71	3.47	4.22
39	.26	.50	.50	.85	1.43	2.13	2.78	3.56	4.33
40	.27	.51	.51	.87	1.47	2.18	2.85	3.65	4.44
41	.27	.52	.52	.89	1.50	2.23	2.92	3.74	4.55
42	.28	.54	.54	.91	1.54	2.29	2.99	3.83	4.66
43	.28	.55	.55	.93	1.57	2.34	3.06	3.92	4.77
44	.29	.56	.56	.95	1.61	2.39	3.13	4.01	4.88
45	.29	.57	.57	.97	1.64	2.45	3.20	4.10	4.99
46	.30	.58	.58	.99	1.68	2.50	3.27	4.19	5.10
47	.30	.59	.59	1.01	1.71	2.55	3.34	4.28	5.21
48	.31	.60	.60	1.03	1.75	2.61	3.41	4.37	5.32
49	.31	.61	.61	1.05	1.78	2.66	3.48	4.46	5.43
50	.32	.62	.62	1.07	1.82	2.71	3.55	4.55	5.54
51	.32	.63	.63	1.09	1.85	2.76	3.62	4.64	5.65
52	.33	.65	.65	1.11	1.89	2.82	3.69	4.73	5.76
53	.33	.66	.66	1.13	1.92	2.87	3.76	4.82	5.87
54	.34	.67	.67	1.15	1.96	2.92	3.83	4.91	5.98
55	.34	.68	.68	1.17	1.99	2.98	3.90	5.00	6.09
56	.35	.69	.69	1.19	2.03	3.03	3.97	5.09	6.20
57	.35	.70	.70	1.21	2.06	3.08	4.04	5.18	6.31
58	.36	.71	.71	1.23	2.10	3.14	4.11	5.27	6.42
59	.36	.72	.72	1.25	2.13	3.19	4.18	5.36	6.53
60	.37	.73	.73	1.27	2.17	3.24	4.25	5.45	6.64
61	.37	.74	.74	1.29	2.20	3.29	4.32	5.54	6.75
62	.38	.76	.76	1.31	2.24	3.35	4.39	5.63	6.86
63	.38	.77	.77	1.33	2.27	3.40	4.46	5.72	6.97
64	.39	.78	.78	1.35	2.31	3.45	4.53	5.81	7.08
65	.39	.79	.79	1.37	2.34	3.51	4.60	5.90	7.19
66	.40	.80	.80	1.39	2.38	3.56	4.67	5.99	7.30
67	.40	.81	.81	1.41	2.41	3.61	4.74	6.08	7.41
68	.41	.82	.82	1.43	2.45	3.67	4.81	6.17	7.52
69	.41	.83	.83	1.45	2.48	3.72	4.88	6.26	7.63
70	.42	.84	.84	1.47	2.52	3.77	4.95	6.35	7.74

Parcel Post Information

The Domestic Parcel Post Service offers a convenient, quick and efficient means of transporting mailable parcels to any post-office in the United States or its possessions, and to Canada, Cuba, Mexico and Panama.

Domestic parcel post mail includes merchandise, farm and factory products, seeds, cuttings, bulbs, roots, scions and plants, books, catalogues, miscellaneous printed matter and all other mailable matter not embraced by law in the first and second class.

Rates—Third-class matter embraces circulars, books (including catalogues), merchandise, seeds, bulbs, etc. not over 8 ounces in weight. The rate of postage on third-class mail matter shall be 1½ cents for each 2 ounces or fraction thereof, up to and including 8 ounces in weight, except that the rate of postage on books, catalogues, seeds, cuttings, bulbs, roots, scions and plants, not exceeding 8 ounces in weight shall be 1 cent for each 2 ounces or fraction thereof, except as herein provided for library books; Provided, That, under such regulations as the Postmaster General may establish for the collection of the lawful revenue and for facilitating the handling of such matter in the mails, it shall be lawful to accept for transmission in the mails without postage stamps, or with precancelled stamps affixed, separately addressed identical pieces of third-class matter in quantities of not less than 20 pounds or of not less than 200 pieces subject to pound rates of postage applicable to the entire bulk mailed at one time; Provided further, that the rate of postage on third-class matter mailed in bulk under the foregoing provision shall be 12 cents for each pound or fraction thereof, except that in the case of books, catalogues, seeds, cuttings, bulbs, roots, scions and plants, the rate shall be 8 cents for each pound or fraction thereof; Provided, however, that the rate of postage on third-class matter mailed in bulk under the foregoing provisions shall be not less than 1 cent per piece.

Fourth class matter includes printed matter, merchandise, and all matter weighing in excess of 8 oz. except first and second-class matter. The limit of weight is 70 pounds for all zones. The limit of size is 100 inches in length and girth combined. In measuring a parcel, the greatest distance in a straight line between the ends (but not around the parcel) is taken as its length, while the distance around the parcel at its thickest part is taken as its girth. For example, a parcel 35 inches long, 10 inches wide and 5 inches high measures 65 inches in length and girth combined. On parcels exceeding 84 inches the minimum postage charge is the 10-pound rate for zone addressed.

Special Delivery Service—A mailable parcel will be accorded the usual special delivery service when special delivery or ordinary stamps are affixed thereto in addition to the postage, as follows: Up to 2 pounds, 15 cents: over 2 pounds to 10 pounds, 25 cents; over 10 pounds to maximum weight, 35 cents.

When ordinary stamps are used the words, "Special Delivery" must be placed on the wrapper.

Insurance on Parcels—A mailable parcel on which the postage is fully prepaid may be insured against loss in an amount equivalent to its actual value. Fees; 5 cents for value not to exceed $5.00; 10 cents for value not to exceed $25.00; 15 cents for value not to exceed $50.00; 25 cents for value not to exceed $100.00; 30 cents for value not to exceed $150.00; 35 cents for value not to exceed $200.00. Return Receipt for insured mail, 3 cents prepaid for each parcel. Both postage and fee must be prepaid by stamps affixed to the parcel. Such mail may be insured at any post office or station thereof, or by rural carriers, but must not be deposited in street mail boxes or in mail drops at post offices.

Special Handling—Parcels of fourth-class matter marked "Special Handling" will receive the same expeditious handling, transportation and delivery accorded first-class mail when additional postage is affixed as follows; Up to 2 pounds, 10 cents; over 2 pounds to 10 pounds, 15 cents: over 10 pounds, 20 cents.

C.O.D. Service—The sender of a mailable package on which the postage is fully prepaid may have the price of the article and the charges thereon collected from the addressee on the payment of a fee of 12 cents in stamps in addition to the postage, provided the amount to be collected does not exceed $5, 17 cents over $5 and not over $25, and 22 cents over $25 and not over $50; 32 cents over $50 and not over $100; 40 cents over $100 and not over $150 and 45 cents over $150 and not over $200. Such a parcel becomes automatically insured for not exceeding $5, $25, $50, $100, $150 or $200 according to whether a 12, 17, 22, 32, 40 or 45c fee was paid.

Illustration

Amount of your bill........................	$2.50
C. O. D. fee........................	.12
Postage (say)........................	.23
Amount to be collected........................	$2.85

Inclosures—There may be placed on fourth-class matter, any marks, numbers, names, or letters for purpose of description. There may be written on blank leaves or cover of any book a simple manuscript dedication or inscription not in the nature of personal correspondence. Such inscriptions as "Merry Christmas," "With Best Wishes," may be written on fourth-class mail or on a card enclosed therewith.

There may be inclosed with fourth-class matter a written or printed invoice or bill showing the name and address of the sender and of the addressee, the names and quantities of articles enclosed, together with inscriptions indicating "For purpose of description," the price, style, stock number, size, and quantity of the articles; the order or file number, date of order, and date and manner of shipment: and the initial or name of the salesman, or of the person by whom the articles were packed or checked.

Sealing Parcel Post Matter—Parcels may be mailed at parcel post rates sealed, provided the parcels bear the proper printed indicia, name and address of the manufacturer, producer or shipper and the inscription, "Postmaster: This parcel may be opened for postal inspection if necessary."

Regular postage stamps may be used on all parcel post matter. Packages must bear the name and address of the sender, preceded by the word "From."

INDEX

A   Page

- **ABC** Bushings 388
  - Reducers 388
- **Abrasive** Grain, Alundum 237
  - Grain, Crystolon 237
  - Wheels, American 240–243
- **Accessories**, Flexipipe 574, 575
  - Pyrometer, Hoskins 114
- **Accessory** Sets, Welding 477
- **Accurate** Tanks, Pump 577
- **Acetylene** Cap Lamps, Universal 519
  - Generators 483
- **Acid** Gloves 523
- **Acid-Core** Wire Solder 490
- **Acid-Filled** Solder 490
- **Acids** 585
- **Adapters**, Copper, Sweat, Chase .. 170
  - Hose, Spray Gun, Imperial 510
- **Adjustable** Wrenches, Crescent .. 279
  - Wrenches, Crestoloy 279
  - Wrenches, Westcott 280
- **Adnun** Pavers, Black Top 407
- **Adze** Handles 271
- **Adzes**, Carpenters' 468
  - Hubbard 468
  - Railroad 468
  - Trackmen's 431
- **Aeroil** Furnaces, Lead Melting 155
  - Guns, Fire 409
  - Heaters, Concrete 409
  - Salamanders 409
- **Aertite** Coating 178
- **Agricultural** Forges, Champion 470
- **Air** Adjusting Valves, Imperial .. 509
  - Cocks 106, 108
  - Compressor Information 590
  - Compressor Oil 503
  - Compressors 411–413
  - Drill Hose 382
  - Hammer Couplings, Dixon 387
  - Hoists, Curtis 455
  - Hoists, Detroit 454
  - Hose 382
  - Hose, Spray Painting, Imperial 509
  - Hose Nipples 386
  - Hose Stems 386
  - Line Oilers, Gardner-Denver 415
  - Nozzles, Lunkenheimer 106
  - Pipe 62, 575
  - Prospector Core Drills, Long Year 418
  - Receivers, Gardner-Denver 415
  - Relief and Vacuum Valves, Combined, McCracken 163
- **Air-Fed** Respirators 496
- **Air-Gas** Pop Relief Valves, Lunkenheimer 97
- **Ajax** Stoves, Heating 497
- **Albany** Grease 503
- **Alcohol**, Denatured 585
- **Aldon** Levels, Track 56
- **Alemite** Drive Tools, Lubricating System 197
  - Fittings, Button Head 197
  - Fittings, Push Type 197
  - Guns, Button Head 197
  - Guns, Push Type 197
  - Hose, Button Head 197

A   Page

- **Alemite** Lubricating Equipment .. 197
- **Alexander** Car Replacers 56
- **Allen** Soldering Salts 491
  - Tapping Machines 228
- **Alligator** Lacing, Belt 329
- **Altitude** Gauges, Crosby 113
  - Relief Valves, Kieley 163
  - Valves, Kieley 163
- **Alto** Tapping Machines 228
- **Alton** Scrapers 420
- **Aluminum** Dinner Pails 524, 525
  - Funnels, Imperial 508
  - Levels, Empire 270
  - Paint 181
  - Rules, Lufkin 268
- **Alundum** Abrasive Grain 237
- **Alvor** Constant Level Oil Controls, Lunkenheimer 200
- **Amalgam**, Copper, Sheet 15
- **Amalgam** Scrapers, Rubber 578
- **American Ashcroft** Siphons, Steam Gauge 111
- **American Beauty** Irons, Soldering 494
- **American** Crayons 273
  - End Tools, Fence 28
  - Filters, Oil 201
  - Meters, Water 161
  - Nails 26
  - Steel Wool 238
  - Thermometers 117
  - Wheels, Grinding 240–243
- **Ammonia** Bends, Malleable Iron 124
  - Bends, Wrought Steel 124
  - Fittings, Malleable Iron 124
  - Gauges, Crosby 112
  - Unions, Flange 124
  - Valves, Drop-Forged Steel, Vogt 95
- **Amsco** Filler Bars, Welding 486
  - Repointers, Dipper Tooth 488
  - Rods, Welding 486
- **Anchor** Shackles 53
- **Anchors**, Bolt, Cinch 47
  - Drive, Hammer, Diamond 49
  - Screw, Cinch 49
  - Screw, Diamond 49
  - Screw, Rawlplug 48
- **Anderson** Balancing Ways 308
- **Anemometers**, Taylor 113
- **Aneroid** Barometers, Taylor 113
- **Angle** Iron Combinations, Whitney 304
  - Milling Cutters 223
  - Valves, All Iron, Lunkenheimer 89
  - Valves, Brass, Lunkenheimer . 79–85
  - Valves, Brass, Standard 85
  - Valves, Brass, Scott 169
  - Valves, Brass, Walworth 85–87
  - Valves, Iron Body, Lunkenheimer 89, 90
  - Valves, Iron Body, Walworth .. 91
  - Valves, Steel, Lunkenheimer .. 94
- **Angles**, Steel 7
- **Annealed** Wire 31
- **Annite** Cleaning Compound 238
- **Antidote Kits**, Cyanide Poisoning 529

A   Page

- **Anvils**, Blacksmiths' 471
- **Apparel**, Protective 521–524
- **Aqua-Air** Needle Valves, Brass, Lunkenheimer 85
- **Arbor** Presses, Greenerd 301
- **Arbors**, Chuck, Drill, Jacobs 226
  - Chuck, Drill, Lee 225
  - End Mill, Shell, Cleveland 221
  - Reamer, Shell, Cleveland Peerless 217
  - Shell Tool, Cleveland 217
- **Arc** Welders 476
- **Arch** Punches 285
- **Armide** Cutters 234
- **Armstrong Bros.** Cutters, Pipe .. 258
  - Dies, Pipe 257
  - Stocks and Dies, Pipe 257
- **Armstrong** Boring Tools, Lathe .. 231
  - Clamps 235
  - Cutters, Threading Tool 232
  - Cutters, Tool Holder, Lathe . 233, 234
  - Cutting-Off Tools, Lathe 230
  - Dogs, Lathe 235
  - Holders, Carbide Tool 230
  - Holders, Cutter, Grinding 232
  - Holders, Drill 212
  - Holders, Lathe Tool 229–232
  - Holders, Tool, Boring 231
  - Jacks 232
  - Knurling Tools, Lathe 232
  - Planer Tools 231
  - Posts, Lathe Tool 232
  - Shaper Tools 231
  - Side Tools, Lathe 230
  - Threading Tools, Lathe 232
  - Wrenches, Car 276
  - Wrenches, Chrome Vanadium Steel 275
  - Wrenches, Construction 275
  - Wrenches, Drop Forged 274–276
  - Wrenches, Engineers' 274, 275
  - Wrenches, Structural 276
- **Army** Type Stretchers 529
- **Asbestocel** Pipe Covering 184
- **Asbesto-Metallic** Gasketing Tape. 380
- **Asbestos** Braided Packing 377
  - Cement 178
  - Clothing 524
  - Clutch Blocks, Friction, Dodge 343, 345
  - Clutch Rings, Friction, Dodge 343
  - Fire Felt 182
  - Folded Gaskets 380
  - Friction Material, Condor 381
  - Furnace Cement 178
  - Helmets 524
  - High Temperature Packing 378
  - Lead Joint Runners 154
  - Mittens 524
  - Paper 182
  - Roll Board 182
  - Rope Packing 380
  - Sheet Millboard 182
  - Sheet Packing 376
  - Sleeves 524
  - Wick Packing 381

A

Page

Asbestos-Metallic Sheet Packing 376
Asbestos-Sponge Pipe Covering 183
Ash, Bone 585
  Soda 238, 585
Ashcroft Siphons. Steam Gauge 111
Asphalt Emulsion 181
  Mattocks 429
  Plank, Mineral Surfaced 406
  Plastic Compound 181
  Rakes 429
Asphaltic-Asbestos Coating 178
Assortments, Sponge 205
Atha Hammers, Riveting 473
  Picks, Geologists' 430
Atkins Solder, Silver 490
Atlas Scrapers 395
Attachments, Chain, Link-Belt 361, 362
  Detachable Link Chain, Ewart 361, 362
  Knee, Saw Mill, Howell 462
  Saw, Tractor 466
  Valve, Pump, Reseater, Dexter. 96
Auger Bit Sets, Irwin 290
  Bits, Irwin 290
Augers, Breast 567
  Rafting, Irwin 291
  Ship 290
Automobile Pump Oilers 203
Auxiliary Drilling Heads, Hoefer. 228
  Valves, Hydrant 159
Axe Handles 271
  Stones, Norton 239
  Wedges 272
Axes, Double Bit 468
  Kelly 468
  Miners' 468
  Rafting 468
  Sager 468
  Single Bit 468
  Union 468
Axle Clips 564
Axles, Car, Mine 564
Axles and Wheels, Carriage, Saw Mill, Howell 461

B

B & L Blocks 443-445
BBB Coil Chain 51
Babbitrite 490
Babbitt Faced Hammers 474
  Metal 489
  Metal Retainer 490
  Rims, Sprocket 72
Back Pressure Valves, Davis 100
  Pressure Valves, Fisher 100
Backing Out Punches 471
Badger Movers, Car 469
Bag Respirators 527
  Trucks 513
Bags, Ore 579
  Powder, Du Pont 421
  Water, Desert 502
Bake-Oven Thermometers, Taylor 118
Balanced Valves, Davis 101
  Whistle Valves, Lunkenheimer. 107
Balancing Ways, Anderson 308
Bale Ties, Hay 31
Ball, Rod and Pebble Mill Grinding Media 24
Ball Pein Hammers 270
Ballast Forks 429
Balls, Bearing 42
  Chrome Alloy Steel 42
Band Saw Blades, Dry Ice, Milford 298
  Saw Blades, Metal, Milford 298
  Saw Blades, Metal, Wide 294
  Saw Blades, Wood, Milford 295
  Saw Guides, Yates-American 320

B

Page

Band Saws, Dry Ice, Jones 300
  Saws, Dry Ice, Milford 298
  Saws, Metal, Milford 298
  Saws, Metal, Wide 294
  Saws, Power, Jones 300
  Saws, Power, Marvel 300
  Saws, Power, Yates-American 319
  Saws, Wood, Milford 295
Bands, Cable, Morse-Starrett 437
  Steel 6
Banner Calipers, Lufkin 267
  Dividers, Lufkin 267
Bar Benders, C. H. & E. 304
  Cutters, Shears and Punches, Combined, Pels 305
  Cutting Shears, Edwards 304
  Solder 490
Barbed Berry Box Nails 28
  Car Nails 27
  Roofing Nails 26
  Wire 29
Barber-Colman Hobs 223
Bark Spuds 467
Barnes Cutters, Pipe 258
Barnstead Stills, Water 578
Barometers, Taylor 113
Barrel Nails 27
  Trucks 513
Barrows, Concrete 422
  Wheel 422
Bars, Bronze, Bunting 491
  Claw 431
  Crow 431
  Extension, Pipe Hanger 151
  Filler, Welding, Amsco 486
  Grate 177
  Lining 430
  Pry 270
  Reinforcing 5
  Ripping 431
  Spike, Coal Mine 431
  Splice 53
  Steel, Bessemer 6
  Steel, Cold Drawn 21
  Steel, Cold Finished 21, 22
  Steel, Grizzly 8
  Steel, Mild 5–8
  Steel, Open Hearth 5–8
Bartlett Snips 303
Basa Hammers 474
Basic Thread Dimensions 587
Basket Hasps 503
Battery Testers, Storage 117
Bausch & Lomb Magnifiers 577
  Testers, Linen 577
Beading Tools, Mound 285
Beakhorn Stakes, Pexto 308
Beam and Frame Scales 515
Bearing Balls 42
  Boxes, Shaft, Dodge 351
  Metal 489
  Scrapers, Pilley 285
Bearings, Bronze, Bunting 492
  Hanger, Shaft, Dodge-Timken. 356
  Post, Shaft, Dodge 355
  Solid Journal, Shaft, Dodge 351
Beaver Cutters, Tubing 165
Beeswax 238
Beet Forks 429
Bell Cord, Wire 436
  Hangers' Drills, Greenlee 290
Bell and Spigot Pipe, Cast Iron 152
Bellows, Hand 512
Bells and Flanges, Cast Iron, Water Main 153
Belmont Valves, Pump 547
Belt Cement 328
  Clamps, Iron Screw 332
  Conveyor Capacities 327
  Conveyors, Robins 363
  Couplings, Moran 329
  Cutters, Clipper 332

B

Page

Belt Dressing 328
  Fasteners, Crescent 331
  Lacing, Alligator 329
  Lacing, Bristol 332
  Lacing, Clipper 300
  Lacing, Wire, Bristol 329
  Lacing Machines, Clipper 330
  Preservative 328
  Punches 332
  Rivets 40
  Rivets, Crescent 331
  Tighteners, Swinging, Medart 356
  Trainers, Robins 364
Belting, Chain, Detachable Link 361, 362
  Compensated 326
  Conveyor 326
  Cotton, Solid Woven 327
  Elevator 327
  Grader 328
  Hog Beater 328
  Leather 325
  Rubber 325–327
  Transmission 326, 327
Belting Information 324–327
Belts, Endless 326, 327
  Leather, Miners' 524
  Safety, Leather 524
  V 333–335
Bench Brushes, Wire 510
  Drills, Champion 316, 317
  Grinders, Clizbe 245
  Oilers 202
  Plates, Pexto 308
Benches, Saw, Jones 321
Benders, Bar, C. H. & E. 304
  Pipe, Hays 165
  Rail, Chicago 55
  Rail, Umeco 56
Bending Brakes, Chicago 307
  Tools, Copper Tube, Chase 165
Bends, Cast Iron, Water Main 152
  Return, Brass, Screwed 148
  Return, Cast Iron, Screwed, Standard 140
  Return, Malleable Iron, Ammonia 124
  Return, Malleable Iron, Screwed, Crane 141
  Return, Malleable Iron, Screwed, Standard 145
  Return, Seamless Steel, Welding, Taylor Forge 127
  Return, Wrought Steel, Ammonia 124
  Y, Brass, Screwed 148
  Y, Malleable Iron, Screwed, Crane 141
  Y, Malleable Iron, Screwed, Standard 144
Bent Boiler Tubes 59
Berg Finishers, Concrete 408
  Surfacers, Concrete 408
Berry Box Nails 28
Bessemer Steel 6, 23
Bethlehem Steel Ties, Mine 54
Bevel Gears, Cast Iron 358
Bevels, Lufkin 265
Bibb Reseaters, Skinner 95, 96
  Washers 169
Bibbs, Hose, Compression 168
  Hose, Ground Key 168
  Plain, Compression 168
  Plain, Ground Key 168
Bib-Cocks, Imperial 509
Bicarbonate, Soda 585
Bicycle Spoke Sheaves 440
Bilge Pumps, Blakeslee 122
Bin Gates, Ore 397
Binders, Load, Swivel 469
Bit Braces, Millers Falls 289
  Extensions, Millers Falls 290

B — Page

- **Bit** Grinders, Rock, Massco 417
    - Sets, Auger, Irwin 290
    - Stock Drills 210
- **Bits**, Auger, Irwin 290
    - Car, Irwin 290
    - Chisel, Yates-American 291
    - Drill 23
    - Drill, Rock, Timken 416
    - Electricians', Speedbor 290
    - Expansive, Irwin-Trubor 290
    - Machine, Mining 567
    - Machine, Yates-American 291
    - Saw, Hoe 294
    - Tool, Mo-Max 234
    - Tool Holder, Rex 233, 234
- **Bituminous** Distributors, Kinney 406
- **Black** Steel Sheets 11, 12
- **Black Top** Pavers, Adnun 407
- **Blacksmiths'** Anvils 471
    - Chisels 471
    - Coal 470
    - Flatters 471
    - Forges, Champion 470
    - Fullers 471
    - Hammers 472
    - Hardies 471
    - Punches 471
    - Set Hammers 471
    - Sledges 472, 473
    - Swages 471
    - Tongs 472
    - Twist Drills 209
    - Vises 288
- **Blades**, Saw, Band, Dry Ice, Milford 298
    - Saw, Band, Metal, Milford 298
    - Saw, Band, Metal, Wide 294
    - Saw, Band, Wood, Milford 295
    - Saw, Compass, Disston 292
    - Saw, Hack, Chase 165
    - Saw, Hack, Milford 296, 297
    - Saw, Keyhole, Disston 292
    - Saw, Pruning, Disston 292
- **Blakeslee** Pumps, Bilge 122
    - Pumps, Jet 122
- **Blanks**, Die, Branding 494
- **Blast** Gates, Champion 574
- **Blasting** Caps, DuPont 419
    - Fuse 419
    - Machines, Du Pont 420
    - Paper, Rawhide 419
    - Powder, Du Pont 419
- **Blind** Flanges, Cast Iron, Extra Heavy 137
    - Flanges, Cast Iron, Standard 133
    - Flanges, Forged Steel, Taylor Forge 129
    - Flanges, Steeliron, Extra Heavy 137
- **Block** Comparator Outfits, LaMotte 163
    - Insulation 181
- **Blocks**, Clutch, Friction, Dodge 343, 345
    - Head, Howell 462
    - Hoisting, Chain, Yale 446–453
    - Hoisting, Pul-Lift, Yale 450
    - Manila Rope 443–445
    - Pillow, Shaft, Dodge 351–353
    - Pillow, Shaft, Dodge-Timken 353, 354
    - Snatch, Manila Rope 444
    - Snatch, Wire Rope 445
    - Swage, Cast Iron 470
    - Tackle, Manila Rope 443
    - Tackle, Wire Rope 444
    - Troublemen's, Klein 284
    - Wire Rope 444, 445
- **Blow Horn** Stakes, Pexto 308
    - Torches, C & L 493, 494
    - Torches, Turner 494
- **Blowers**, Electric, Champion 571
    - Flue 57

B — Page

- **Blowers**, Hand, Champion 470
    - Pressure, Champion 571
    - Pressure, Leiman 573
    - Pressure, Roots-Connersville 571, 574
    - Pressure, Victor-Acme 572
    - Ventilating, Coppus 568
    - Ventilating, Ilg 569, 570
    - Volume, Champion 571
    - Volume, Ilg 571, 574
- **Blow-Off** Valves, Everlasting 94
    - Valves, Lunkenheimer 93, 94
- **Blowpipe** Test Sets, Braun 584
- **Blowpipes** 480–482
- **Blue**, Prussian 237
- **Board**, Friction 182
    - Mill, Sheet, Asbestos 182
    - Roll, Asbestos 182
- **Boat** Nails, Bright 27
- **Boiler** Brushes 56
    - Compound 176
    - Couplings, Malleable Iron 148
    - Elbows, Malleable Iron 148
    - Feed Pumps and Receivers 531
    - Feeders, McDonnell 102
    - Feeders and Cut-Offs, Combined, McDonnell 102
    - Feeding Information 593
    - Gaskets 379
    - Graphite 502
    - Grates 177
    - Information 59
    - Mountings, Lunkenheimer, Application of 68, 69
    - Paint 181
    - Patch Bolts 36
    - Picks 270
    - Ratchets, Keystone 289
    - Rivets 41
    - Setting Compound 181
    - Staybolts 36
    - Taps, Winter Bros 219
    - Tube Cleaners 57
    - Tube Ferrules 59
    - Tubes, Bent 59
    - Tubes, Seamless Steel 59
    - Wall Coating 178
- **Boiler** and Stack Paint 181
- **Boilers**, Brick-Set 175
    - Fire Box, Portable 176
    - Heating 175
    - Power 174, 175
    - Tubular 174, 175
    - Water Tube, Murray 175
- **Boker** Letters and Figures 272
- **Bolt**, Rivet and Nut Cutters, Wolverene 282
- **Bolt** Anchors, Cinch 47
    - Clippers, Porter 282
    - Dies, GTD 262
    - Dies, Little Giant 261
    - Extras 35
    - Thread Information 587
    - Tongs 472
- **Bolt** and Pipe Machines, Tom Thumb 252
- **Bolts**, Carriage 33
    - Cultivator 35
    - Drift 37
    - Elevator 36
    - Expansion 48
    - Flattened End, Grinnell 151
    - Lag 34
    - Machine 32, 33
    - Patch, Boiler 36
    - Pipe, Grinnell 151
    - Planer Head 323
    - Plow 35
    - Service Box 159
    - Stay, Boiler 36
    - Stove 34
    - Toggle, Diamond 49

B — Page

- **Bolts**, Track 53
- **Bonding** Drills, Cleveland 207
- **Bone** Ash 585
- **Books**, Mining, Placer 578
- **Boots**, Elevator, Cast Iron 373
    - Rubber 523
- **Borax** 585
- **Boring** Tool Holders, Armstrong 231
    - Tools, Lathe, Armstrong 231
- **Boss** Mixers, Cement 408
- **Bosses'** Sample Picks 430
- **Bostwick** Niles Lath, Expanded Metal 16
- **Bottle** Oilers, Lunkenheimer 200
- **Bottoms**, Lamp, Justrite 520
- **Bowes** Racks, Hose 391
- **Box** Covers, Meter 162
    - Nails, Cement Coated 25
    - Nails, Smooth 25
    - Strapping 273
- **Boxes**, Bearing, Shaft, Dodge 351
    - Dynamite, Hardsocg 421
    - Flat, Shaft, Dodge 351
    - Powder, Hardsocg 421
    - Roadway 159
    - Service 159, 160
    - Take-Up, Dodge 368
    - Take-Up, Robins 365
    - Valve, Extension 157
    - Valve, Hydrant 159
- **Boxwood** Rules, Lufkin 268, 269
- **Brace** Wire 31
- **Braces**, Bit, Millers Falls 289
    - Corner, Millers Falls 289
    - Timber, Simplex 458
    - Trench, Simplex 458
- **Brads**, Flooring 26
- **Braided** Packing, Asbestos 377
    - Packing, Flax 379
    - Packing, Gasoline Rod 378
    - Packing, Jute 379
    - Packing, Mogul 378
    - Packing, Rajah 378
    - Packing, Semi-Metallic 378
- **Brake** Lining 381
- **Brakes**, Bending, Chicago 307
- **Branch** Connections, Hays 166, 167
- **Branches**, Y, Cast Iron, Flanged, Extra Heavy 135
    - Y, Cast Iron, Flanged, Spiral Pipe 130
    - Y, Cast Iron, Flanged, Standard 131
    - Y, Cast Iron, Screwed, Extra Heavy 138
    - Y, Cast Iron, Screwed, Standard 139
    - Y, Cast Iron, Water Main 153
- **Branding** Die Blanks 494
- **Brass**, Rod 17
    - Roll 490
    - Sheet 490
- **Brass** Fittings, Screwed 148, 149
    - Fittings, Walworth 149
    - Nipples 149
    - Pipe, Seamless 18
    - Rods 17
    - Unions 149
- **Brattice** Cloth 575
- **Braun** Blowpipe Test Sets 584
- **Breakers**, Pneumatic 414
    - Primary, Telsmith 399
- **Breast** Augers 567
    - Drills, Millers Falls 288
    - Plates, Leetonia 567
- **Brick**, Fire 178, 179
- **Bricks**, Rubbing 239
- **Brick-Set** Boilers 175
- **Bridge** Reamers, Taper, Cleveland 215
- **Bristo** Screws, Set 45
- **Bristol** Lacing, Belt 329, 332
- **Broad** Hatchets 272

B — Page

- **Broderick & Bascom** Rope, Wire 432–437
- **Bronze** Bars, Bunting 491
  - Bearings, Bunting 492
- **Brooms,** Garage 511
  - Mill 511
  - Push 511
  - Smelter 511
  - Warehouse 511
- **Brown & Sharpe** Tapers 587
- **Brunton** Transits, Pocket 578
- **Brushes,** Bench, Wire 510
  - Boiler 56
  - Casting, Wire 510
  - Dusting, Counter 511
  - Dusting, Wire 510
  - File 250
  - Flue 56, 57
  - Gear, Wire 510
  - Moulders' 511
  - Scratch, Wire 510, 511
  - Varnish 511
  - Wall 511
  - Wheel, Wire, U. S. 239
  - Wire 510, 511
- **Brushes** and Scrapers, Flue, Combined 57
- **Bucket** Cars, Ore 560
  - Elevator Belting 327
  - Hooks, Fire 577
- **Buckets,** Dinner, Aluminum 524, 525
  - Dragline, Northwest 393
  - Elevator, MS 374
  - Elevator, Salem 374
  - Fire, Galvanized 577
  - Ore 560
  - Self-Dumping 561
  - Water, Galvanized 501
  - Water, Mine 560
- **Buffs,** Cotton Flannel 239
- **Bullard** Belts, Safety, Leather 524
  - Goggles, Wire Screen 526
  - Hats, Protective 522
  - Kits, First Aid 527–529
  - Masks, Canister 527
  - Stretchers 529
- **Bull-Dog** Dogs, Logging 469
  - Grabs, Log 469
- **Bullion** Molds 584
- **Bundling** Table, Pipe 62
- **Bunting** Bars, Bronze 491
  - Bearings, Bronze 492
- **Burke** Milling Machines 309
- **Burner** Tips, Lamp, Justrite 520
- **Burners,** Hydro-Carbon, Cary 583
  - Lamp, Carbide 518
  - Oil, Massco 583
  - Torch, C & L 494
- **Burr** Keyseaters, Shaft 309
  - Milling Machines 309
- **Burring** Reamers, Cleveland 217
- **Burrs,** Copper 40
- **Burt** Filters, Oil 201
- **Bush** Hammers 473
- **Bushing** Castings 491
- **Bushings,** Brass, Screwed 148, 149
  - Brass, Walworth 149
  - Cast Iron, Cored 491
  - Cast Iron, Screwed, Standard 140
  - Cast Iron, Solid 491
  - Cast Iron, Standard 140
  - Clutch, Friction, Dodge 346
  - Copper, Sweat, Chase 171
  - Cored, Cast Iron 491
  - Coupling, Hose, Fire, ABC 388
  - Eccentric, Cast Iron 140
  - Malleable Iron, Screwed, Standard 145
  - Pulley, Tight and Loose 341
  - Solid, Cast Iron 491
  - Steel, Screwed, Vogt 125
- **Buss** Bar Copper 19

B — Page

- **Busters,** Rivet 472
- **Button** Head Fittings, Alemite 197
  - Head Guns, Alemite 197
  - Head Hose, Alemite 197
  - Pliers 284

C

- **C** Clamps, Armstrong 235
- **C-H** Magnets, Separator 368
  - Pulleys, Separator, Magnetic 368
- **C. H. & E.** Benders, Bar 304
- **C & L** Burners, Torch 494
  - Fire Pots 493
  - Torches, Blow 493, 494
  - Torches, Needle 493
- **C-M** Canisters 527
  - Masks, Canister 527
- **Cabinet** Paper, Garnet 236
- **Cable,** Drilling 442
  - Guard, Highway 437
  - Welding 477
- **Cable** Bands, Morse-Starrett 437
  - Cutters, Morse-Starrett 438
  - Reel Jacks, Simplex 458
- **Cadgers,** Steel 204
- **Cage** Type Separators, Strong 122
- **Cages,** Mine 558, 559, 562
- **Cakes,** Floodlight, Carbic 521
- **Caliper** Rules, Lufkin 268
- **Calipers,** Banner, Lufkin 267
  - Firm-Joint, Lufkin 267
  - Micrometer, Lufkin 263
- **Calking** Irons 155
  - Lead 155
  - Tools, Cinch 47
- **Cameron** Pumps, Sinking 550
- **Campbell** Pins, Cotter 42
- **Canal** and Low Pressure Reservoir Gates 163
- **Candle** Wick Packing 378
- **Candles,** Miners' 520
- **Candlesticks,** Miners' 520
- **Canister** Masks 527
- **Canisters,** C-M 527
- **Cans,** Carbide 520
  - Gasoline, Eagle 204
  - Non-Explosive 204
  - Oil, Eagle 204
  - Safety 204
  - Waste, Oily 205
- **Cant** Hooks 467
- **Cap** Crimpers, Du Pont 420
  - Lamps, Acetylene, Universal 519
  - Screws 44
- **Capacities,** Conveyor, Belt 327
- **Cape** Chisels 286
- **Capewell** Nails, Horseshoe 474
- **Caps,** Blasting, Du Pont 419
  - Brass, Screwed 148
  - Cast Iron, Screwed, Standard 140
  - Cast Iron, Water Main 152, 153
  - Copper, Sweat, Chase 171
  - Malleable Iron, Screwed, Crane 141
  - Malleable Iron, Screwed, Standard 145
  - Miners' 521, 522
  - Screw, Lamp, Justrite 520
  - Seamless Steel, Welding, Taylor Forge 127
- **Car** Axles, Mine 564
  - Bits, Irwin 290
  - Grease, Mine 503
  - Hitchings, Mine 563
  - Jacks, Simplex 457
  - Movers 469
  - Nails, Barbed 27
  - Oilers, Pit 204
  - Replacers, Alexander 56
  - Wheels, Mine 564
  - Wrenches, Armstrong 276
- **Carbic** Floodlight Cakes 521

C — Page

- **Carbide** 585
  - Generator 521
  - Lamp, Miners' 521
- **Carbide** Cans 520
  - Flasks 520
  - Lamb Burners 518
  - Lamps, Guy Dropper 519
  - Lamps, Miners' 518–520
  - Lights 521
  - Tool Holders, Lathe, Armstrong 230
- **Card** Cars, Ore 563
  - Rollers 440, 441
  - Sheaves 439, 441
  - Trucks 562, 564, 565
  - Turntables 55
- **Cards,** File 250
- **Carey** Millboard, Asbestos 182
  - Plank, Asphalt, Mineral Surfaced 406
  - Roofing 17
- **Carpenters'** Adzes 468
  - Chalk 273
  - Hammers 271
- **Carriage** Bolts 33
  - Drives, Wire Cable, Saw Mill, Howell 460
  - Wheels and Axles, Saw Mill, Howell 461
- **Carriers,** Oil, Miners' 204
  - Sawdust, Howell 465
  - Timber 467
- **Cars,** Bucket, Ore 560
  - Ore 563
- **Carts,** Concrete 421
- **Cary** Burners, Hydro-Carbon 583
- **Case** Hardener 474, 475, 585
- **Casehardening** Compound 474, 475
- **Cash** Controllers, Standard 102
- **Casing,** Lap Welded 66
  - Well, Lap Welded 66
  - Well, Steel 67
- **Casing** Nails 26
- **Cast Iron** Fittings, Flanged, Extra Heavy 134–137
  - Fittings, Flanged, Spiral Pipe 130
  - Fittings, Flanged, Standard 130–134
  - Fittings, Screwed, Extra Heavy 138, 141
  - Fittings, Screwed, Standard 138–141
  - Fittings, Screwed, Weights of 138
  - Fittings, Water Main 152, 153
  - Pipe, Bell and Spigot 152
  - Pipe, Flanged 152
  - Solid Pulleys 341
  - Split Pulleys 341
- **Casters,** Industrial 514
  - Truck 514
- **Casting** Brushes, Wire 510
- **Castings,** Bushing 491
- **Castor** Oil, Machine 503
- **Cast-Refract** 179
- **Cattle** Barbed Wire 29
- **Caulking** Irons 155
  - Lead 155
  - Tools, Cinch 47
- **Caustic** Soda 238, 585
- **Cee-Tee-Co** Pliers 283
- **Cellar** Drainers, Penberthy 122
- **Cement** 585
  - Asbestos 178
  - Belt 328
  - Furnace 178–180
  - Insulating 178–180
  - Iron, Smooth-On 177
  - Magnesia 178
  - Refractory 178–180
- **Cement** Coated Nails 25
  - Mixers, Boss 408
- **Center** Gages, Lufkin 265
  - Keys, Cleveland 226
  - Punches 286
- **Centers,** Lathe, Cleveland 210

C Page

Centrifugal Pump Information... 586
  Pumps ... 534–541
  Pumps, Priming... 586
Centripac Packing... 379
Chain, Coil, Straight Link... 51
  Detachable... 361, 362
  Dredge... 50
  Feed, Vulcan... 50
  Herc-Alloy... 50, 51
  Machine, Coal Cutting... 50
  Machine, Liberty... 51
  Roller, Silverlink, Link-Belt... 359
  Straight Link... 51
Chain Attachments, Link-Belt. 361, 362
  Drills, Millers Falls... 289
  Drives, Silent, Link-Belt... 359
  Hoists, Yale... 446–453
  Hooks... 53
  Lap Links... 52
  Link Fence... 29
  Pipe Tongs, Williams... 282
  Pipe Vises, Trimo... 287
  Rafting Dogs... 469
  Repair Links... 50, 52
  Shackles... 53
  Swivels... 52
Chain and Hooks, Safety... 438
Chain-Belting, Detachable Link... 361, 362
  Information... 362, 592
Chains, Log... 51
  Sling... 51, 52
Chairs, Landing... 558
Chalk, Carpenters'... 273
  Lump... 238
Chalk Lines... 273
Chamois Skins... 205
Champion Blowers, Hand... 470
  Blowers, Pressure... 571
  Blowers, Volume... 571
  Disc Wheels and Mine Fans.. 573
  Drills, Bench... 316, 317
  Drills, Post... 317
  Drills, Sensitive... 316
  Fans, Exhaust... 571
  Fans, Ventilating... 573
  Forges... 470
  Gates, Blast... 574
  Irons, Tuyere... 470
  Mandrels, Saw... 292
Channel Iron Punches, Whitney.. 303
Channels, Steel... 7, 8
Chase Bending Tools, Copper Tube 165
  Blades, Hack Saw... 165
  Fittings, Flared, Copper... 164
  Fittings, Sweat, Copper... 164, 170, 171
  Sizing Tools, Tubing... 165
  Templates... 165
  Tubing, Copper... 164
Chatillon Scales... 516
Check Valves, Brass, Angle, Lunkenheimer... 87, 88
  Valves, Brass, Angle, Walworth 88
  Valves, Brass, Ball, Lunkenheimer... 88
  Valves, Brass, Horizontal, Lunkenheimer... 87, 88
  Valves, Brass, Horizontal, Walworth... 88
  Valves, Brass, Lift, Lunkenheimer... 87
  Valves, Brass, Swing, Lunkenheimer... 88
  Valves, Brass, Swing, Scott... 169
  Valves, Brass, Swing, Walworth 89
  Valves, Brass, Vertical, Lunkenheimer... 87, 88
  Valves, Brass, Vertical, Walworth... 88
  Valves, Iron Body, Angle, Lunkenheimer... 91, 92

C Page

Check Valves, Iron Body, Horizontal Lunkenheimer.. 91, 92
  Valves, Iron Body, Horizontal, Walworth... 92
  Valves, Iron Body, Swing, Lunkenheimer... 92
  Valves, Iron Body, Swing, Walworth... 93
  Valves, Iron Body, Vertical, Walworth... 93
  Valves, Pump, Force Feed, McCullough... 201
  Valves, S.A.E., Imperial... 171
Checks, Miners'... 273
  Tool Room, Brass... 273
Chemical Composition Extras, Steel... 21
  Workers' Goggles... 525
Chemicals... 585
Cherry Heat Compound, Welding. 475
Chesterton Cutters, Gauge Glass.. 111
Chicago Brakes, Bending... 307
  Cleaners, Boiler Tube... 57
Chime Whistles, Lunkenheimer.. 107
Chippers' Goggles... 525
Chisel Bits, Yates-American... 291
  Mortisers, Hollow, Yates-American... 322
Chisels, Blacksmiths'... 471
  Cape... 286
  Cold, Blacksmiths'... 471
  Cold, Non-Sparking... 270
  Cold, S & H... 286
  Diamond Point, Non-Sparking. 270
  Diamond Point, S & H... 286
  Hollow, Yates-American... 291
  Hot, Blacksmiths'... 471
  Mortising, Yates-American... 291
  Side... 472
  Track... 431
  Turning, Yates-American... 272
  Wood, Crescent... 285
Chlorine... 585
Christen Bellows... 512
Chrome Vanadium Steel Wrenches, Armstrong... 275
Chuck Arbors, Drill, Jacobs... 226
  Arbors, Drill, Lee... 225
Chucking Reamers, Cleveland Peerless... 214
Chucks, Drill, Jacobs... 226, 227
  Drill, Lee... 225
  Lathe, Cushman... 228, 229
  Portomatic, Jacobs... 227
  Tapping, Errington... 227
Chute Lining... 328
Chutes, Coal... 421
  Concrete... 421
  Grain... 421
  Sand... 421
Cinch Anchors, Bolt... 47
  Anchors, Screw... 49
  Calking Tools... 47
Circle Information... 593
Circular Saws... 292–294
  Snips, Crescent... 303
Clamps, Belt, Iron Screw... 332
  C, Armstrong... 235
  Hose... 388
  I-Beam, Grinnell... 151
  Machinists', Armstrong... 235
  Parallel, Toolmakers', Lufkin.. 266
  Pipe, Ellis... 156
  Pipe, Emergency... 150
  Pipe, Walworth... 156
  Saw... 295
  Screw, Armstrong... 235
  Wire and Sleeve, Klein... 284
Classification, Steel, Tool, Standard... 24, 233
Claw Bars... 431
Clay, Fire... 178

C Page

Clay Picks... 270
Cleaners, File, Hargrave... 250
  Tip, Justrite... 520
  Tube, Boiler... 57
Cleaning Compound... 238
Cleansing Materials... 238
Clearflow Strainers, Pipe, Suction 123
  Valves, Foot... 97
Cle-Forge Twist Drills, Straight Shank... 207
  Twist Drills, Taper Shank.. 206, 207
Cleveland Arbors, End Mill, Shell 221
  Arbors, Reamer, Shell, Peerless. 217
  Arbors, Shell Tool... 217
  Centers, Lathe... 210
  Counterbores... 213
  Counterbores and Spot Facers.. 213
  Countersinks... 210
  Cutters, Milling... 221
  Drifts, Drill... 226
  Drills and Countersinks, Combined... 210
  Extractors, Screw... 216
  Grindstones... 246
  Keys, Center... 226
  Mills, End... 221
  Mills, Hollow... 221
  Pilots, Counterbore... 213
  Reamer Sets, Adjustable... 215
  Reamers, Adjustable... 215
  Reamers, Bridge, Taper... 215
  Reamers, Burring... 217
  Reamers, Chucking, Peerless... 214
  Reamers, Expansion... 214
  Reamers, Expansion, Peerless.. 214
  Reamers, Hand... 214
  Reamers, Peerless... 214, 216
  Reamers, Shell... 216
  Reamers, Shell, Peerless... 216
  Reamers, Taper Pin... 216
  Sockets, Twist Drill... 212
  Twist Drill Sets... 210, 211
  Twist Drills, Bit Stock... 210
  Twist Drills, Blacksmiths'... 209
  Twist Drills, Bonding... 207
  Twist Drills, Coe Shank... 209
  Twist Drills, Large Shank... 206
  Twist Drills, Letter Size... 208
  Twist Drills, Long Set... 207
  Twist Drills, Short Set... 208, 209
  Twist Drills, Small Shank.. 206, 207
  Twist Drills, Square Shank, Ratchet... 209
  Twist Drills, Straight Shank. 207–211
  Twist Drills, Taper Shank.. 206, 207
  Twist Drills, Wire Gauge... 208
  Twist Drills, Wood... 209
  Wheelbarrows... 422
Clevises, Mine Car Hitching... 563
Climax Welding Compound... 475
Clinch Nails... 27
  Tongs... 472
Cling-Surface Belt Preservative.. 328
Clipper Belt Lacing Machines... 330
  Cutters, Belt... 332
  Lacing, Belt... 300
Clippers, Bolt, Porter... 282
Clips, Axle... 564
  Die, Little Giant... 261
  Lamp... 520
  Rope, Wire... 438
Clizbe Grinders... 245
  Stands, Polishing... 246
Clocks, Watchmen's... 575
Cloth, Brattice... 575
  Emery, Crystal Bay... 236
  Hardware... 505
  Screen, Robins... 402
  Screen, Wire... 402–406, 505
  Three-M-ite... 236
  Wire... 402–406, 505
Cloth Inserted Tubing... 386

C

Page

- **Clothes** Hangers, Sanitary, Union . . . 524
- **Clothing**, Asbestos . . . 524
  - Duck, Fireproofed . . . 524
  - Protective . . . 521–524
- **Clout** Nails, Wire . . . 27
- **Clover** Compound, Grinding and Lapping . . . 237
- **Clutch** Blocks, Friction, Dodge . . . 343, 345
  - Cut-Off Couplings, Friction, Dodge . . . 346, 347
  - Facings . . . 381
  - Rings, Friction, Dodge . . . 343
- **Clutches**, Friction, Dodge . . . 342–347
  - Pulley, Dodge . . . 342–347
- **Clyde** Engines, Hoisting . . . 556
  - Hoists, Gasoline . . . 555
- **Coal**, Blacksmiths' . . . 470
- **Coal** Chutes . . . 421
  - Cutting Machine Chain . . . 50
  - Forks . . . 429
  - Mine Spike Bars . . . 431
  - Miners' Caps . . . 521, 522
  - Miners' Goggles . . . 526
  - Picks . . . 430
  - Screen Wire Cloth . . . 404
  - Screens . . . 397
  - Tar . . . 585
  - Wedges . . . 567
- **Coal-Hole** Rings and Covers . . . 162
- **Coating**, Aertite . . . 178
  - Asphaltic-Asbestos . . . 178
  - Protective, P & B . . . 181
  - Protective, Quigley . . . 180, 181
  - Roof . . . 181
  - Wall, Boiler . . . 178
- **Coats**, Asbestos . . . 524
  - Fireproofed Duck . . . 524
  - Rubber . . . 523
- **Cock** Weights . . . 71
  - Wrenches, Walworth . . . 104
- **Cocks**, Air . . . 106, 108
  - Corporation, Hays . . . 166, 167
  - Curb, Hays . . . 167, 168
  - Cut-Off, Imperial . . . 509
  - Cylinder . . . 108
  - Drain, Ground Key, Lunkenheimer . . . 108
  - Gas, Iron Body, Walworth . . . 105
  - Gas Service . . . 104
  - Gauge, Compression . . . 109
  - Gauge, Lunkenheimer . . . 109
  - Gauge, Self-Closing . . . 109
  - Gauge, Steam . . . 108
  - Oil Country, Iron, Walworth . . . 104
  - Sill . . . 169
  - Sill and Siamese, Combination . . . 389
  - Steam, Brass . . . 104
  - Steam, Ground Key . . . 108
  - Steam, Iron . . . 105
  - Stop, Compression, Scott . . . 169
  - Stop, Hays . . . 168
  - Stop, Hexo . . . 168
  - Stop, Hydrant . . . 168
  - Stop, Patent Guard . . . 168
  - Stop, Signet . . . 169
- **Cocoa** Matting . . . 381
- **Coddington** Magnifiers . . . 577
- **Coil** Chain, Straight Link . . . 51
  - Packing . . . 377–379
  - Springs . . . 42
- **Coke** Forks . . . 429
  - Screens . . . 397
- **Cold** Chisels, Blacksmiths' . . . 471
  - Chisels, Non-Sparking . . . 270
  - Chisels, S & H . . . 286
  - Drawn Steel . . . 21
  - Finished Steel . . . 21, 22
  - Punched Nuts . . . 38, 39
  - Shuts . . . 52
- **Coleman** Lanterns, Instant-Lite . . . 500
  - Pumps, Suction . . . 500

C

Page

- **Collaring** Machines, Waugh . . . 418
- **Collars**, Shaft, Dodge . . . 348, 349
- **Collets**, Little Giant . . . 260
- **Colorado** Fence . . . 29, 30
  - Gates . . . 31
  - Gears, Micarta . . . 358
  - Posts . . . 29
  - Stays, Fence . . . 29
  - Wire, Barbed . . . 29
- **Coloring** Compound . . . 238
- **Columbian** Rope, Manila . . . 442
  - Vises, Garage . . . 287
  - Vises, Machinists' . . . 286
  - Vises, Pipe . . . 287
  - Vises, Woodworkers' . . . 288
- **Columbus McKinnon** Chain . . . 50–52
- **Columns**, Gauge, Water . . . 110
  - Screw, Gardner-Denver . . . 415
- **Combination** Pipe Vises, Columbian . . . 287
  - Sets, Lufkin . . . 266
  - Squares, Lufkin . . . 266
  - Stones, India . . . 238
- **Combinations**, Angle Iron, Whitney . . . 304
- **Common** Flanges, Cast Iron . . . 141
  - Nails, Cement Coated . . . 25
  - Nails, Copper . . . 25
  - Nails, Polished . . . 25
- **Common-Sense** Expansion Reamers, Cleveland . . . 214
- **Companion** Flanges, Cast Iron, Extra Heavy . . . 137
  - Flanges, Cast Iron, Standard . . . 133
  - Flanges, Forged Steel, Taylor Forge . . . 129
  - Flanges, Malleable Iron, Extra Heavy . . . 137
  - Flanges, Malleable Iron, Standard . . . 133
  - Flanges, Steeliron, Extra Heavy 137
  - Flanges, Steeliron, Standard . . . 133
- **Comparator** Outfits, Block, LaMotte . . . 163
- **Compass** Saw Blades, Disston . . . 292
- **Compasses**, Taylor . . . 117
- **Compensated** Air Hose . . . 382
  - Belting . . . 326
- **Composition**, Crocus . . . 238
  - Tripoli . . . 238
- **Composition** Extras, Chemical, Steel . . . 21
- **Compound**, Boiler . . . 176
  - Boiler Setting . . . 181
  - Casehardening . . . 474, 475
  - Cleaning . . . 238
  - Coloring . . . 238
  - Graphite, Joint, Pipe . . . 258
  - Joint, Damit . . . 258
  - Joint, Q-Seal . . . 258
  - Lapping and Grinding . . . 237
  - Plastic, Asphalt . . . 181
  - Sealing, Joint . . . 258
  - Smooth-On . . . 177
  - Surface-Hardening . . . 475
  - Welding . . . 475
- **Compound** Gauges, Crosby . . . 112, 113
- **Compression** Springs . . . 42
- **Compressor** Information, Air . . . 590
- **Compressors**, Air . . . 411–413
- **Concrete** Barrows . . . 422
  - Carts . . . 421
  - Chutes . . . 421
  - Finishers, Berg . . . 408
  - Heaters, Aeroil . . . 409
  - Mixers, Lansing . . . 408
  - Pavers, MultiFoote . . . 407
  - Reinforcing Bars . . . 5
  - Surfacers, Berg . . . 408
- **Condenser** Tubes . . . 67
- **Condor** Asbestos Friction Material 381
- **Connecting** Wire, Du Pont . . . 420

C

Page

- **Connections**, Branch, Hays . . . 166, 167
  - Hose, Spray Gun, Imperial . . . 510
  - Service Pipe, Copper, Hays . . . 166
  - Siamese . . . 389
- **Constant** Level Oil Controls, Lunkenheimer . . . 200
- **Construction** Wrenches, Armstrong 275
- **Containers**, Gravity Feed, Imperial 508
  - Pressure Feed, Imperial . . . 509
- **Continental** Screws, Thread-Forming . . . 46
- **Contractors'** Equipment, Northwest . . . 393
- **Controllers**, Draft, Furnace, Cash . 102
  - Level, Fluid, Davis . . . 101
  - Liquid Level, Fisher . . . 101
  - Standard, Cash . . . 102
  - Temperature, Taylor . . . 118
- **Controls**, Oil, Constant Level, Lunkenheimer . . . 200
- **Conveyor** Belting . . . 326
  - Capacities, Belt . . . 327
  - Couplings, Screw, Link-Belt . . . 370
  - Drive Ends, Screw, Link-Belt . . . 370
  - Hangers, Link-Belt . . . 371
  - Information . . . 373
  - Pulleys, Dodge . . . 341
  - Trough Ends, Link-Belt . . . 372
  - Trough Linings, Link-Belt . . . 368
  - Troughs, Link-Belt . . . 369
- **Conveyors**, Belt, Robins . . . 363
  - Roller, Gravity . . . 363
  - Spiral . . . 370
  - Trough, Porta . . . 396
- **Coopers'** Rivets . . . 42
- **Copper**, Buss Bar . . . 19
  - Rod . . . 19
  - Sheet, Cold Rolled . . . 18
  - Sheet, Hot Rolled . . . 18
- **Copper** Amalgam, Sheet . . . 15
  - Boiler Tube Ferrules . . . 59
  - Faced Hammers . . . 474
  - Flared Fittings, Chase . . . 164
  - Hammers, Solid . . . 474
  - Needles . . . 420
  - Pipe, Seamless . . . 18
  - Pipe Benders, Hays . . . 165
  - Pipe Flanging Tools, Hays . . . 165
  - Pipe Holders, Hays . . . 165
  - Pipe Reamers, Mueller . . . 165
  - Rods . . . 19
  - Service Goosenecks . . . 166
  - Service Pipe Connections, Hays 166
  - Service Pipe Fittings, Hays . 166–168
  - Sheets, Cold Rolled . . . 18
  - Sheets, Hot Rolled . . . 18
  - Sulphate . . . 585
  - Sweat Fittings, Chase . . 164, 170, 171
  - Tube Bending Tools, Chase . . . 165
  - Tube Sizing Tools, Chase . . . 165
  - Tubing, Dehydrated . . . 18
  - Tubing, Seamless . . . 18
  - Tubing Cutters, Beaver . . . 165
  - Water Tubing, Chase . . . 164
  - Wire, Soft . . . 19
  - Wire Nails . . . 25
- **Copperoid** Pipe . . . 61
  - Steel Sheets . . . 15
- **Coppers**, Soldering . . . 494
- **Coppersmiths'** Stakes, Pexto . . . 308
- **Coppus** Blowers, Ventilating . . . 568
  - Turbines, Steam . . . 187
- **Cord**, Bell, Wire . . . 436
  - Sash, Samson Spot . . . 442
  - Sash, Wire . . . 436
- **Cordwood** Saw Frames . . . 466
  - Saws . . . 292
- **Core** Drills, Longyear . . . 418
- **Cored** Bushings, Cast Iron . . . 491
- **Corner** Braces, Millers Falls . . . 289
- **Corporation** Stop Couplings, Hays 167
  - Stops, Hays . . . 166, 167

C Page

- **Corrosive** Service Valves, Lunkenheimer 72, 89
- **Corrugated** Asbestos Paper 182
  - Ridge Roll 17
  - Steel Roofing 16
  - Steel Siding 16
- **Cotter** Keys 42
  - Pins 42
- **Cotters**, Spring 42
- **Cotton** Belting, Solid Woven 327
  - Flannel Buffs 239
  - Hooks 273
  - Hose 385, 386
  - Scales 515
  - Trucks 514
  - Waste 205
- **Counter** Dusters 511
  - Scales 516
- **Counterbore** Pilots, Cleveland 213
- **Counterbores**, Cleveland 213
- **Counterbores** and Spot Facers, Cleveland 213
- **Counters**, Revolution, Starrett 262
  - Revolution, Veeder-Root 262
- **Countershaft** Ends, Trough, Link-Belt 371
- **Countersinks**, Machine, Cleveland. 210
- **Countersinks** and Drills, Combined, Cleveland 210
- **Coupling** Bushings, Hose, Fire, ABC 388
  - Expanders, Hose, Elk 389
  - Reducers, Hose, Fire, ABC 388
- **Couplings**, Belt, Moran 329
  - Boiler, Malleable Iron 148
  - Brass, Screwed 148, 149
  - Brass, Walworth 149
  - Cast Iron, Water Main 153
  - Conveyor, Screw, Link-Belt 370
  - Copper, Sweat, Chase 171
  - Cut-Off, Clutch, Friction, Dodge 346, 347
  - Hammer, Air, Dixon 387
  - Hose, Expansion Ring 386, 389
  - Hose, Garden 388
  - Hose, Metal, Mulconroy 385
  - Hose, Norgren 386
  - Hose, Sherman 386
  - Hose, Spray Gun, Imperial 510
  - Hose, Steam 388
  - Hose, Water 388
  - Hydraulic 124
  - Joint, Pipe, Hays 166
  - Malleable Iron, Screwed, Crane. 141
  - Malleable Iron, Screwed, Standard 144
  - Malleable Iron, Walworth 145
  - Mine Car Hitching 563
  - Pipe, Dayton 65
  - Pipe, Standard 148
  - Pipe, Taylor Forge 65
  - Reducer, Pump Rod 548
  - Rod, Pump 547, 548
  - Rod, Sucker 547
  - Rod, Wood 547
  - S.A.E., Imperial 171
  - Shaft, Dodge 349
  - Shaft, Dodge-Shaw 349
  - Shaft, Falk 350
  - Shaft, L-R 351
  - Steel, Vogt 125
  - Stop, Corporation, Hays 167
  - Union, S.A.E., Imperial 171
  - Wrought, Walworth 145
- **Cover-All** Goggles 479, 525
- **Covering**, Pipe, Sectional 183, 184
- **Cover's** Goggles 526
- **Covers**, Crucible 583
  - Meter Box 162
  - Service Box 159
  - Trough, Conveyor, Link-Belt 369
  - Valve Box, Extension 157

C Page

- **Covers and Rings**, Coal-Hole 162
  - Manhole 162
  - Sewer 162
- **Crane** Fittings, Malleable Iron, Screwed 141
- **Cranes**, Power, Northwest 393
  - Traveling, I-Beam, Yale 451
- **Cranes** and Hoists, Floor, Portable 455
- **Crayons**, Lumber 273
  - Railroad 273
- **Creamery** Hose 383
- **Creosote** 585
- **Crescent** Belt Fasteners 331
  - Chisels, Wood 285
  - Drill Steel 23
  - Extractors, Rivet 331
  - Frames, Hack Saw 297
  - Grips, Wire 284
  - Pliers 283, 284
  - Rivets, Belt 331
  - Screwdrivers 285
  - Snips, Circular 303
  - Snips, Tinners' 303
  - Tool Steel 24
  - Wrenches, Adjustable 279
- **Crestoloy** Nippers 284
  - Pliers 283
  - Wrenches, Adjustable 279
- **Crimpers**, Cap, Du Pont 420
- **Crimps**, Ram, Press 547
- **Crocus** Composition 238
- **Crosby** Gauges, Altitude 113
  - Gauges, Ammonia 112
  - Gauges, Compound 112, 113
  - Gauges, Hydraulic 112
  - Gauges, Pressure 112, 113
  - Gauges, Test 113
  - Gauges, Vacuum 112, 113
  - Pumps, Test, Inspectors' 111
  - Testers, Dead Weight 111
- **Cross** Diagonal Packing 377
  - Valves, Brass, Lunkenheimer.80–84
  - Valves, Brass, Walworth 85
  - Valves, Iron Body, Lunkenheimer 89, 90
- **Crosscut** Saw Handles, Disston... 467
  - Saws, Disston 466, 467
  - Saws, Keystone 466
- **Crosses**, Brass, Screwed 148
  - Cast Iron, Flanged, Extra Heavy 134, 135
  - Cast Iron, Flanged, Spiral Pipe. 130
  - Cast Iron, Flanged, Standard 130, 131
  - Cast Iron, Screwed, Extra Heavy.138
  - Cast Iron, Screwed, Standard.. 139
  - Cast Iron, Water Main 152
  - Copper, Sweat, Chase 171
  - Drop-Forged Steel, Screwed, Vogt 125
  - Malleable Iron, Ammonia 124
  - Malleable Iron, Railing 146
  - Malleable Iron, Screwed, Crane. 141
  - Malleable Iron, Screwed, Standard 144
  - Pipe, Dayton 65
- **Crow** Bars 431
- **Crucible** Covers 583
  - Furnaces, Massco 582
  - Molds 584
  - Tongs 583
- **Crucibles**, Graphite, Dixon 583
- **Crusher** Mortars, Iron 579
- **Crushers**, Gyrasphere, Telsmith... 399
  - Jaw, Telsmith-Wheeling 400
  - Laboratory 580
- **Crushing**, Loading and Screening Plants, Telsmith 400
- **Crystolon** Abrasive Grain 237
  - Axe Stones 239
- **Cultivator** Bolts 35
- **Cup** Glasses, Oil, Lunkenheimer.. 199

C Page

- **Cup** Leathers 546
  - Washers, Oil, Lunkenheimer... 199
- **Cup-Case** Thermometers, Taylor.. 115
- **Cups**, Elevator, MS 374
  - Elevator, Salem 374
  - Feed, Spray Gun, Imperial 508
  - Grease, Empress 198
  - Grease, Lubricating System, Alemite 197
  - Grease, Lunkenheimer 198
  - Oil, Lunkenheimer 198, 199
- **Curb** Stops, Hays 167, 168
- **Curtis** Hoists, Air 455
- **Curve** Sheaves, Card 441
- **Cushman** Chucks, Lathe 228, 229
  - Electric Light Plants 191
  - Electric Light and Power Plants.191
  - Engines, Gasoline 190
- **Cut** Lacing 329
- **Cut-Off** Cocks, Imperial 509
  - Couplings, Clutch, Friction, Dodge 346, 347
  - Saws, Howell 465
  - Switches, Low-Water, McDonnell 103
- **Cut-Offs**, Low-Water, McDonnell 102, 103
- **Cut-Offs** and Safety Feeders, Combined, McDonnell 102
- **Cutter** Holders, Grinding, Armstrong 232
  - Pins, Pipe 258
  - Rollers, Pipe 258
  - Wheels, Pipe 258
- **Cutters**, Angle Milling 223
  - Armide 234
  - Belt, Clipper 332
  - Bolt, Porter 282
  - Bolt, Rivet and Nut, Wolverene 282
  - Cable, Morse-Starrett 438
  - Fuse, Du Pont 420
  - Gasket 381
  - Gear, Involute 224, 225
  - Gear, Stocking 225
  - Glass 111
  - Glass, Gauge 111
  - Keyseat, Woodruff 223
  - Lace, Elliott 332
  - Milling 221–225
  - Pipe, Armstrong Bros. 258
  - Pipe, Barnes 258
  - Pipe, Cast Iron 154
  - Pipe, Trimo 258
  - Plain Milling 222
  - Rod, Marvel 304
  - Screw Slotting 223
  - Shears and Punches, Combined, Pels 305
  - Side Milling 222
  - Sprocket Wheel 224
  - Swivel Head, Porter 282
  - Threading Tool, Lathe, Armstrong 232
  - Tool Holder, Lathe, Armstrong 233, 234
  - Tube, Wiedeke 58
  - Tubing, Beaver 165
  - Valve, Pump Seat, S & W.... 96
  - Washer 381
- **Cutting**, Pipe 61
- **Cutting** Extras, Steel 9, 21
  - Machines, Metal, Marvel...299, 300
  - Machines, Metal, Racine...299, 300
  - Machines, Pipe Oster....252, 254
  - Machines, Pipe, Oster-Williams 254
  - Machines, Pipe, Toledo....250, 251
  - Machines, Pipe, Williams...253, 255
  - Machines, Pipe and Bolt, Tom Thumb 252
  - Torches 480–482

C Page

Cutting-Off Tools, Lathe, Armstrong 230
Cyanegg 585
Cyanide 585
  Sodium 585
Cyanide Poisoning Antidote Kits. 529
Cylinder Cocks 108
  Oil 503
Cylinders, Well, Goulds........ 548

D

Dado Heads, Huther 293
Dairy Thermometers, Taylor..... 115
Damit Joint Compound 258
Darnell Casters 514
Data, Useful 586–594
Davis Controllers, Fluid Level... 101
  Governors, Pump 195
  Regulators, Pressure 99
  Strainers 123
  Valves, Back Pressure 100
  Valves, Balanced 101
  Valves, Float 101
  Valves, Reducing, Pressure..... 100
Dayton Couplings, Pipe 65
  Fittings, Pipe 65
Dead Weight Testers, Crosby..... 111
Dehydrated Copper Tubing 18
Delta Files 248, 249
  Rasps 248, 249
Demon Cleaners, Tube, Boiler.... 57
Denatured Alcohol 585
Denver Mortars 579
Depot Scales 515
Depth Gages, Micrometer, Lufkin 264
  Gages, Rule, Lufkin 264
  Gages and Protractors, Lufkin. 264
Desert Water Bags 502
Desmond-Huntington Dressers ... 244
Detachable Chain 361, 362
Detex Newman Clocks, Watchmen's 575
Detroit Hoists, Electric 453
  Hoists, Pneumatic 454
  Lubricators, Engine 200
Dewatering Wheels 373
Dexter Reseaters, Valve 96
Diagonal Packing, Cross........ 377
  Rod Packing 377
Diamond Anchors, Drive, Hammer 49
  Anchors, Screw 49
  Core Drills, Longyear........ 418
  Dressers 244
  Drills 49
  Frames, Saw........ 466
  Grinder Tools........ 244
  Holders, Drill........ 50
  Points, Drill........ 50
  Saw Attachments, Tractor..... 466
  Shields, Expansion........ 48
  Toggles 49
Diaphragm Force Pumps, Goulds. 545
  Lift Pumps, Goulds........ 545
  Suction Pumps, Goulds........ 545
Diaphragms, Pump, Rubber..... 547
Die Blanks, Branding........ 494
  Clips, Little Giant........ 261
  Heads, Toledo........ 256
  Stocks, Little Giant........260, 261
Diener Cans, Safety........ 204
  Cans, Waste, Oily........ 205
Di-En-Key Bolts, Expansion..... 48
Dies, Bolt, GTD........ 262
  Bolt, Little Giant........ 261
  Pipe, Armstrong Bros........ 257
  Re-Threading, GTD........ 261
Dies and Stocks, Pipe, Armstrong Bros. 257
  Pipe, Toledo........256, 257
  Screw, Little Giant........259, 260
Diesel Engine Babbitt Metal..... 489

D Page

Dietz Lanterns, Kerosene........ 500
Differential Chain Hoists, Yale... 449
Diggers, Hole, Post........427, 428
Dimensions, Cast Iron Flanged Fittings, Extra Heavy...... 136
  Cast Iron Flanged Fittings, Standard 132
  Keyseat, Dodge........ 348
  Pulley, Steel, Split, Dodge........ 340
  Thread, Basic........220, 587
  Valve, Angle, Iron Body, Walworth 91
  Valve, Cross, Iron Body, Walworth 91
  Valve, Globe, Iron Body, Walworth 91
Dinner Pails, Aluminum......524, 525
Dipped Pipe Extras........ 66
Dipper Tooth Repointers, Amsco. 488
Dippers, Water, Tin........ 501
Disc Wheels, Pneumatic Tire.... 422
  Wheels and Mine Fans, Champion 573
Discs, Valve, Non-Metallic, Lunkenheimer 79
Disston Blades, Compass Saw.... 292
  Blades, Keyhole Saw........ 292
  Blades, Pruning Saw........ 292
  Clamps, Saw........ 295
  Hammers, Swage Bar........ 295
  Handles, Saw, Crosscut....... 467
  Handles, Saw, Hand........ 292
  Handles, Saw, Nest of........ 292
  Saws, Crosscut........466, 467
  Saws, Docking........ 466
  Saws, Hand........ 292
  Saws, Nest of........ 292
  Sets, Saw........ 295
  Swages, Saw........ 295
Distributors, Bituminous, Kinney. 406
Dividers, Banner, Lufkin........ 267
Dixon Compound, Graphite, Pipe Joint 258
  Couplings, Hammer, Air....... 387
  Crayons, Lumber........ 273
  Crucibles 583
  Dressing, Belt........ 328
  Graphite, Boiler........ 502
  Graphite, Flake........ 502
  Oil, Graphited........ 503
Docking Saws, Disston........ 466
Dodge Bearings, Post........ 355
  Bearings, Solid Journal........ 351
  Blocks, Clutch, Friction....343, 345
  Blocks, Pillow........351–353
  Boxes, Flat, Shaft........ 351
  Bushings, Clutch, Friction..... 346
  Clutches, Friction........342–347
  Collars, Shaft........348, 349
  Couplings, Cut-Off, Clutch, Friction........346, 347
  Couplings, Shaft........ 349
  Hangers, Drop........ 355
  Hangers, Post........ 355
  Hubs, Pulley, Steel........ 339
  Idlers 367
  Keyseat Dimensions........ 348
  Pulley Dimensions, Steel, Split. 340
  Pulleys, Conveyor........ 341
  Pulleys, Steel, Split........338–340
  Rings, Clutch, Friction........ 343
  Take-Ups 368
Dodge-Shaw Couplings, Shaft.... 349
Dodge-Timken Bearings, Hanger. 356
  Idlers 367
  Pillow Blocks, Shaft......353, 354
Dogs, Landing........ 558
  Lathe, Armstrong........ 235
  Logging, Bull-Dog........ 469
  Rafting, Chain........ 469
  Ring 469
  Saw Mill, Howell........ 462

D Page

Dormant Scales........ 515
Double Bit Axes........ 468
  Squares, Lufkin........ 265
Dover Measures, Oil........ 205
  Measures and Funnels, Combination 205
Draft Controllers, Furnace, Cash. 102
  Gauge Oil........ 60
  Gauges, Ellison........ 60
Drag Scrapers........ 394
Dragline Buckets, Northwest.... 393
Draglines, Power, Northwest..... 393
Drain Cocks, Ground Key, Lunkenheimer 108
Drainage Pumps........540, 541
Drainers, Cellar, Penberthy...... 122
Dredge Chain........ 50
  Pumps, Kimball-Krogh........ 550
Dressers, Wheel, Grinding....... 244
Dressing, Belt........ 328
Driers, Sand, Sutton........ 409
Drift Bolts........ 37
Drifters 413
Drifting Drills........ 413
  Picks 430
Drifts, Drill, Cleveland........ 226
Drill Bits........ 23
  Bits, Rock, Timken........ 416
  Chuck Arbors, Jacobs........ 226
  Chuck Arbors, Lee........ 225
  Chucks, Jacobs........226, 227
  Chucks, Lee........ 225
  Drifts, Cleveland........ 226
  Grinders, Yankee........ 244
  Grinding Gages........ 265
  Holders, Armstrong........ 212
  Holders, Diamond........ 50
  Hose, Air........ 382
  List for Pipe Taps........ 220
  Points, Diamond........ 50
  Points, Hand, Millers Falls.... 209
  Press Vises, Greene........ 288
  Presses, Champion........316, 317
  Rod Machines, Rock, Toledo... 417
  Rods 23
  Sets, Mechanics'........ 210
  Sets, Twist........210, 211
  Sizes, Tap........220, 592
  Sleeves, Keystone........ 212
  Sleeves, Square Shank........ 212
  Sleeves, Use-Em-Up........ 212
  Sockets, Twist........ 212
  Sockets, Use-Em-Up........ 212
  Stands 311
  Steel 23
  Steel, Hollow........ 416
Drill and Tap Gages, Starrett.... 266
Drill and Wire Gages, Starrett.. 266
Drilling Cable........ 442
  Hammers 473
  Heads, Auxiliary, Hoefer...... 228
  Machines, Water Main, Mueller. 154
  Machines, Well, Star........ 392
  Posts, Keystone........ 212
  Ratchets, Keystone........ 289
  Templates for Flanged Valves and Fittings, Cast Iron, Extra Heavy 134
  Templates for Flanged Valves and Fittings, Cast Iron, Standard 134
Drills, Bell Hangers', Greenlee.... 290
  Bench, Champion........316, 317
  Bit Stock........ 210
  Bonding, Cleveland........ 207
  Breast, Millers Falls........ 288
  Chain, Millers Falls........ 289
  Core, Longyear........ 418
  Diamond 49
  Drifting 413
  Electric........310, 311, 316
  Hand, Millers Falls........ 288

D

Page

Drills, Portable, Electric 310, 311
  Post, Champion 317
  Post, Leetonia 566
  Ratchet, Keystone 289
  Rock 414
  Sensitive, Champion 316
  Star, Diamond 49
  Tamp, Copper Head 420
  Track 56
  Twist, Bit Stock 210
  Twist, Blacksmiths' 209
  Twist, Bonding 207
  Twist, Coe Shank 209
  Twist, Large Shank 206
  Twist, Letter Size 208
  Twist, Long Set 207
  Twist, Ratchet, Square Shank 209
  Twist, Short Set 208, 209
  Twist, Small Shank 206, 207
  Twist, Square Shank 209
  Twist, Straight Shank 207–211
  Twist, Taper Shank 206, 207
  Twist, Wire Gauge 208
  Twist, Wood 209
  Upright, Champion 316, 317
Drills and Countersinks, Combined, Cleveland 210
Drive Anchors, Hammer, Diamond 49
  Ends, Conveyor, Screw, Link-Belt 370
  Gates 31
  Shafts, Pipe Machine, Toledo 251
  Tools, Lubricating System, Alemite 197
Drivers, Screw, Crescent 285
  Screw, Millers Falls 284
  Screw, S & H 285
  Screw, Stanley 270, 284
  Sheeting, Pneumatic 414
Drivers' Lamps, Justrite 519, 520
Drives, Carriage, Wire Cable, Saw Mill, Howell 460
  Chain, Silent, Link-Belt 359
  Power, Oster 252
  Power, Toledo 251
Driving Hammers 472
Drop Hangers, Shaft, Dodge 355
Drop-Forged Steel Fittings, Screwed, Vogt 125
Drums, Hoist, Capacity of 433, 555
Dry Ice Band Saws, Jones 300
  Ice Band Saws, Milford 298
  Screens, Telsmith 401
Drying Ovens, Sample, Massco 582
Duck Clothing, Fireproofed 524
Dumore Grinders, Electric 316
Dumps, Goose Neck 54
Duo Safety Ladders 501
  Shoes, Ladder 501
Du Pont Bags, Powder 421
  Blasting Machines 420
  Caps, Blasting 419
  Crimpers, Cap 420
  Cutters, Fuse 420
  Dynamite 419
  Gelatin 419
  Powder, Blasting 419
  Squibs 419
  Wire, Connecting 420
  Wire, Leading 420
Durant Tallies, Hand 262
Dust, Zinc 585
Dust Goggles 525
Dusters, Counter 511
Dusting Brushes, Counter 511
  Brushes, Wire 510
Dustite Respirators 526
Dynamite, Du Pont 419
Dynamite Boxes, Hardsocg 421
  Hose, Flexible, Metallic 384

E

Page

E-Z Compound, Welding 475
Eagle Cans, Gasoline 204
  Cans, Oil 204
  Fillers, Engineers' 203
  Oilers 202, 203
  Pots, Tallow 203
Eccentric Bushings, Cast Iron 140
Edgers, Howell 463
  Porter-Cable 318
Edwards Shears 304
Eimco-Finlay Loaders 566
Ejectors, Penberthy 121
Elastic Stop Nuts, Self-Locking 40
Elbows, Boiler, Malleable Iron 148
  Brass, Screwed 148
  Cast Iron, Flanged, Extra Heavy 134, 135
  Cast Iron, Flanged, Spiral Pipe 130
  Cast Iron, Flanged, Standard 130, 131
  Cast Iron, Screwed, Extra Heavy 138
  Cast Iron, Screwed, Standard 139
  Cast Iron, Water Main 153
  Copper, Sweat, Chase 170
  Drop-Forged Steel, Screwed, Vogt 125
  Malleable Iron, Ammonia 124
  Malleable Iron, Screwed, Crane 141
  Malleable Iron, Screwed, Standard 143, 144
  Pipe, Dayton 65
  S.A.E., Imperial 171
  Seamless Steel, Welding, Taylor Forge 126
  Stove Pipe 497
  Union, Malleable Iron 148
Electric Blowers, Champion 571
  Drills 310, 311, 316
  Drives, Oster 252
  Drives, Toledo 251
  Finishers, Concrete, Berg 408
  Fish Wire 23
  Freight Elevators 375
  Grinders 313–316
  Grinders, Yankee 244
  Hammers, Little Giant 302
  Hammers, Nazel 302
  Hoists, Detroit 453
  Hoists, Samson 554
  Hoists, Vulcan 552, 553
  Hoists, Yale 452, 453
  Light Plants, Cushman 191
  Light and Power Plants, Cushman 191
  Polishers, Sanders, Saws, Grinders and Drills 310–316
  Saw Tables, Jones 321
  Saws 312, 313
  Solder Pots, Westinghouse 492
  Soldering Irons, American Beauty 494
  Squibs, Du Pont 419
  Surfacers, Concrete, Berg 408
  Tapping Machines, Alto 228
Electrical Supplies 304H
Electricians' Bits, Speedbor 290
  Screwdrivers, Stanley 284
Electrode Holders, Westinghouse 477
Electrodes, Welding 485–488
Elek-Tro-Cut Three-M-ite Cloth 236
Elevator Belting 327
  Bolts 36
  Boots, Cast Iron 373
  Buckets, MS 374
  Buckets, Salem 374
  Heads, Cast Iron 373
  Rope 435
Elevators, Freight, Electric 375
  Hand Power 375
Elk Expanders, Hose Coupling 389
Elliott Cutters, Lace 332

E

Page

Ellis Clamps, Pipe 156
  Plugs, Pipe 156
Ellison Gauges, Draft 60
Emergency Jacks, Simplex 458
  Pipe Clamps 150
Emery Cake 238
  Cloth, Crystal Bay 236
  Wheel Dressers 244
  Wheels, American 240–243
Empire Levels, Aluminum 270
  Plumbs and Levels 270
Empress Cups, Grease 198
Emulsion, Asphalt 181
End Mill Arbors, Shell, Cleveland 221
  Mills 221, 223
  Tools, Fence 28
Endless Belts 326, 327
Ends, Countershaft, Trough, Link-Belt 371
  Drive, Conveyor, Screw, Link-Belt 370
  Stub, Van Stone, Welding, Taylor Forge 127
  Trough, Conveyor, Link-Belt 372
Engine Governors, Gardner-Denver 194
  Governors, Pierce 195
  Information 59
  Lubricators, Detroit 200
  Lubricators, Lunkenheimer 199
  Oil 503
  Room Information 589
Engineers' Fillers, Eagle 203
  Wrenches, Armstrong 274, 275
Engines, Fire, Phomene 576
  Gas and Oil 189
  Gasoline, Cushman 190
  Hoisting, Clyde 556
  Steam, Erie 185
  Steam, Murray 188
  Steam, O. & S. 186
Equivalents, Head and Pressure 193
  Metric 588
Erie Engines 185
  Wrenches, Pipemaster 280
Errington Chucks, Tapping 227
Etched-Stem Thermometers, Taylor 115
Everlasting Valves, Blow-Off 94
Ewart Attachments, Chain 361, 362
  Link-Belt 361, 362
  Sprocket Wheels 360
Exhaust Fans, Champion 571
  Fans, Ilg 499
Exhausters, Roots-Connersville 571
Expanded Metal Lath 16
Expanders, Coupling, Hose, Elk 389
  Tube, Wiedeke 58
Expanding Mandrels, Knock-Out 225
Expansion Bolts 48
  Joints, Walworth 103
  Reamers, Cleveland 214
  Reamers, Cleveland Peerless 214
  Ring Hose Couplings 386, 389
  Rings, Hose 389
  Shields 48
  Valves, Drop-Forged Steel, Ammonia, Vogt 95
Expansive Bits, Irwin-Trubor 290
Extension Bars, Pipe Hanger 151
  Equipment, Metallizing 495
  Ladders 501
  Pieces, Brass, Screwed 148
  Sections, Valve Box 157
  Service Boxes, Mueller 160
  Springs 42
  Valve Boxes 157
Extensions, Bit, Millers Falls 290
  Service Box 159
Extinguishers, Fire 576
Extractors, Pile, McKiernan-Terry 410
  Rivet, Crescent 331
  Screw, Ezy-Out 216

E

Page

Extractors, Tap, Walton ... 217
Extras, Bolt ... 35
  Composition, Chemical, Steel ... 21
  Cutting, Steel ... 9, 21
  Pipe, Dipped ... 66
  Pipe, Galvanized ... 66
  Treatment, Steel ... 21
Ezy-Out Extractors, Screw ... 216

F

Fabricated Steel ... 8
Fabricating, Pipe ... 61
Facers and Counterbores, Spot, Cleveland ... 213
Faces, Hammer, Basa ... 474
Facings, Clutch ... 381
Factory Trucks ... 514
Fairbanks Scales ... 516
Falk Couplings, Shaft ... 350
  Gears ... 357
  Motoreducers ... 357
  Reducers, Speed ... 356, 357
Fans, Exhaust, Champion ... 571
  Exhaust, Ilg ... 499
  Ventilating, Champion ... 571, 573
  Ventilating, Ilg ... 499
Fans and Disc Wheels, Mine, Champion ... 573
Farm Fence ... 30
  Forges, Champion ... 470
  Gates ... 31
Farriers' Hoof Parers ... 472
  Knives ... 474
  Nippers ... 472
  Pincers ... 472
Fasteners, Belt, Crescent ... 331
  Roofing, Sheet ... 26
  Tank, Tecktonius ... 549
Faucet Reseaters, Skinner ... 95, 96
  Washers ... 169
Faucets, Hose, Compression ... 168
  Hose, Ground Key ... 168
  Lawn, Hays ... 169
  Lawn and Siamese, Combination ... 389
  Plain, Compression ... 168
  Plain, Ground Key ... 168
Favorite Wrenches, Ratchet ... 277
Federal Specifications, Handle ... 271
Federated Babbitt Metal ... 489
  Solder ... 490
Feed Chain, Vulcan ... 50
  Chain Repair Links ... 50
  Cups, Spray Gun, Imperial ... 508
  Grinders, Jay Bee ... 475
  Water Heaters, Worthington ... 172
Feeders, Boiler, McDonnell ... 102
  Plate, Telsmith ... 397
  Safety, McDonnell ... 102
Feeders and Cut-Offs, Safety, Combined, McDonnell ... 102
Feeler Gages, Lufkin ... 265
Felt, Fire, Asbestos ... 182
  Hair ... 182
Felt Polishing Wheels ... 239
  Roofing Nails ... 26
Felts, Lamp, Justrite ... 520
Fence, Chain Link ... 29
  Farm ... 30
  Poultry ... 29
  Property Protection ... 29
  Stock ... 30
  Wire ... 29, 30
Fence End Tools ... 28
  Nails, Wire ... 26
  Posts ... 29
  Staples, Wire ... 28
  Stays ... 29
  Wire ... 31
Ferrenewo Valves, Lunkenheimer ... 81, 89–91

F

Page

Ferrules, Tube, Boiler ... 59
Figures, Steel ... 272
File Brushes ... 250
  Cards ... 250
  Cleaners, Hargrave ... 250
  Handles ... 250
Filers, Saw, Gin ... 250
Files, Delta ... 248, 249
  Gin Saw ... 247
  Wood's ... 247
Filler Bars, Welding, Amsco ... 486
Fillers, Engineers', Eagle ... 203
Fillet Gages, Lufkin ... 265
Filters, Oil, American ... 201
  Oil, Burt ... 201
Fine Nails ... 28
Finishers, Concrete, Berg ... 408
Finishing Nails ... 26
Fire Box Boilers, Portable ... 176
  Brick ... 178, 179
  Clay ... 178
  Engines, Phomene ... 576
  Extinguishers ... 576
  Felt, Asbestos ... 182
  Guns, Aeroil ... 409
  Hose ... 385, 386
  Hose Coupling Bushings, ABC ... 388
  Hose Coupling Reducers, ABC ... 388
  Hose Racks ... 391
  Hose Reels ... 391
  Hydrants, National ... 159
  Hydrants, Rensselaer ... 158
  Pail Hooks ... 577
  Pails, Galvanized ... 577
  Pots, C & L ... 493
  Pump Tanks, Accurate ... 577
  Stream Information ... 589
Fireite Cement, Furnace ... 178
Fireproofed Duck Clothing ... 524
Firm-Joint Calipers, Lufkin ... 267
First Aid Kits, Bullard ... 527–529
  Aid Supplies ... 527–529
Fish Wire, Electric ... 23
Fisher Controllers, Liquid Level ... 101
  Governors, Pump ... 196
  Strainers, Pipe ... 123
  Strainers, Suction ... 123
  Valves, Back Pressure ... 100
  Valves, Reducing ... 99
Fitting, Pipe ... 61
Fittings, Ammonia, Malleable Iron ... 124
  Brass, Screwed ... 148, 149
  Brass, Walworth ... 149
  Button Head, Alemite ... 197
  Cast Iron, Flanged, Extra Heavy ... 134–137
  Cast Iron, Flanged, Spiral Pipe ... 130
  Cast Iron, Flanged, Standard ... 130–134
  Cast Iron, Screwed, Extra Heavy ... 138, 141
  Cast Iron, Screwed, Standard ... 138–141
  Cast Iron, Screwed, Weights of 138
  Cast Iron, Water Main ... 152, 153
  Flared, Copper, Chase ... 164
  Flexipipe ... 574, 575
  Forged Steel, Welding, Taylor Forge ... 127–129
  Hose, Gardner-Denver ... 387
  Lubricating, Alemite ... 197
  Malleable Iron, Ammonia ... 124
  Malleable Iron, Railing ... 146
  Malleable Iron, Screwed, Crane ... 141
  Malleable Iron, Screwed, Standard ... 143–145
  Malleable Iron, Screwed, Weights of ... 143
  Pipe, Dayton ... 65
  Pipe, Service, Copper, Hays ... 166–168

F

Page

Fittings, Push Type, Alemite ... 197
  Railing, Malleable Iron ... 146
  S.A.E., Imperial ... 171
  Seamless Steel, Welding, Taylor Forge ... 126, 127
  Steel, Screwed, Vogt ... 125
  Stove Pipe ... 497
  Sweat, Copper, Chase ... 164, 170, 171
  Tube, Brass, Imperial ... 171
  Water Main, Cast Iron ... 152, 153
  Welding, Forged Steel, Taylor Forge ... 127–129
Fittings Tongs, Williams ... 282
Fitz Turbo-Generators ... 192
  Wheels, Water ... 193
Flake Graphite ... 502
Flame Protectors, Lamp, Justrite ... 520
Flange Gaskets, Pipe ... 380
  Unions, Ammonia ... 124
  Unions, Cast Iron, Extra Heavy ... 141
  Unions, Cast Iron, Standard ... 141
  Unions, Forged Steel ... 124
  Unions, Forged Steel, Taylor Forge ... 128
  Unions, Malleable Iron, Standard ... 141
Flanged Fittings, Cast Iron, Extra Heavy ... 134–137
  Fittings, Cast Iron, Spiral Pipe 130
  Fittings, Cast Iron Standard ... 130–134
  Pipe, Cast Iron ... 152
Flanges, Blind, Cast Iron, Extra Heavy ... 137
  Blind, Cast Iron, Standard ... 133
  Blind, Forged Steel, Taylor Forge ... 129
  Blind, Steeliron, Extra Heavy ... 137
  Cast Iron, Water Main ... 153
  Common, Cast Iron ... 141
  Companion, Cast Iron, Extra Heavy ... 137
  Companion, Cast Iron, Standard ... 133
  Companion, Forged Steel, Taylor Forge ... 129
  Companion, Malleable Iron, Extra Heavy ... 137
  Companion, Malleable Iron, Standard ... 133
  Companion, Steeliron, Extra Heavy ... 137
  Companion, Steeliron, Standard 133
  Floor, Cast Iron ... 145
  Floor, Malleable Iron, Railing ... 146
  Forged Steel, Welding, Taylor Forge ... 128
  Malleable Iron, Railing ... 146
  Van Stone, Forged Steel, Taylor Forge ... 128
  Welding, Forged Steel, Taylor Forge ... 128
Flanging Tools, Copper Pipe, Hays ... 165
Flared Fittings, Copper, Chase ... 164
Flarers, Tube, Wiedeke ... 58
Flasks, Carbide ... 520
Flat Boxes, Shaft, Dodge ... 351
Flatters, Blacksmiths' ... 471
Flax Packing ... 379
Flexarc Welding Glass ... 477
Flexible Couplings, L-R ... 351
  Joints, Moran ... 103
  Metallic Hose, Dynamite ... 384
  Metallic Hose, Mulconroy ... 384, 385
Flexipipe ... 574, 575
Flexipipe Accessories ... 574, 575
Flexitallic Gaskets ... 380
Flint, Ground ... 238
Flint Paper ... 236
  Pebbles ... 24

F Page

- **Flints**, Lamp, Justrite ... 520
- **Float** Valves, Davis ... 101
- **Floodlight** Cakes, Carbic ... 521
- **Floor** Cranes and Hoists, Portable 455
  - Flanges, Cast Iron ... 145
  - Flanges, Malleable Iron, Railing 146
  - Grinders, Clizbe ... 245
  - Grinders, St. Louis ... 245
  - Grinders, W. & M. ... 244
  - Grinders, Yankee ... 244
  - Mats, Rubber ... 381
  - Plate, Multigrip ... 10
  - Sanders, Porter-Cable ... 318
  - Stands, Valve, Walworth ... 72
- **Flooring** Brads ... 26
- **Flue** Blowers ... 57
  - Brushes ... 56, 57
  - Brushes and Scrapers, Combined 57
  - Scrapers ... 57
- **Fluid** Hose, Spray Painting, Imperial ... 509
  - Level Controllers, Davis ... 101
- **Flux**, Welding ... 484
- **Fly** Screen Cloth ... 505
- **Foil**, Silver ... 585
- **Folded** Gaskets, Asbestos ... 380
- **Folding** Rules, Lufkin ... 268, 269
- **Foot** Squaring Shears, Niagara .. 306
  - Valves, Clearflow ... 97
  - Valves, Iron Body ... 97
- **Force** Feed Lubricators, McCord. 201
  - Feed Oilers ... 202
  - Pumps, Diaphragm, Goulds ... 545
  - Pumps, Rotary, Goulds ... 546
- **Ford** Covers, Meter Box ... 162
  - Yokes, Meter ... 161
- **Forged** Steel Fittings, Welding, Taylor Forge ... 127–129
- **Forges**, Agricultural, Champion .. 470
  - Blacksmiths', Champion ... 470
  - Farm, Champion ... 470
  - Garage, Champion ... 470
  - Portable, Champion ... 470
  - Rivet, Champion ... 470
- **Forging** Steel ... 23
- **Forks**, Ballast ... 429
  - Beet ... 429
  - Coal ... 429
  - Coke ... 429
  - Rail ... 56
  - Stone ... 429
- **Formers**, Roll, Pexto ... 307
- **Forming** Machines, Roll, Pexto ... 307
- **Foundry** Nails, Smooth ... 25
  - Riddles ... 512
- **Frame** and Beam Scales ... 515
- **Frames**, Saw, Diamond ... 466
  - Saw, Hack, Crescent ... 297
  - Saw, Hack, Milford ... 297
- **Franklin** Electric Light Plants, Cushman ... 191
- **Freight** Elevators, Electric ... 375
- **Freight-House** Trucks ... 514
- **Fresno** Scrapers ... 394
- **Friction** Board ... 182
  - Clutch Blocks, Dodge ... 343, 345
  - Clutch Cut-Off Couplings, Dodge ... 346, 347
  - Clutch Rings, Dodge ... 343
  - Clutches, Dodge ... 342–347
  - Material, Asbestos, Condor ... 381
- **Fullers**, Blacksmiths' ... 471
- **Fume** Masks, Willson ... 527
- **Funnels**, Aluminum, Imperial ... 508
  - Midland ... 204
- **Funnels** and Measures, Combination, Dover ... 205
- **Furnace** Cement ... 178–180
  - Draft Controllers, Cash ... 102
  - Lining ... 178–180
- **Furnaces**, Crucible, Massco ... 582
  - Melting, Lead ... 155

F Page

- **Furnaces**, Melting, Massco ... 582
  - Soldering, C & L ... 493
- **Fuse**, Blasting ... 419
  - Safety ... 419
- **Fuse** Cutters, Du Pont ... 420
- **Fusible** Plugs, Lunkenheimer ... 60

G

- **GTD** Dies, Bolt ... 262
  - Dies, Re-Threading ... 261
  - Wrenches, Tap ... 219, 220
- **Gad** Tongs ... 472
- **Gage** Cocks, Compression ... 109
  - Cocks, Lunkenheimer ... 109
  - Cocks, Self-Closing ... 109
  - Cocks, Steam ... 108
  - Columns, Water ... 110
  - Glass Cutters ... 111
  - Glass Preservers ... 111
  - Glass Washers ... 111
  - Glasses ... 110, 111
  - Oil, Draft ... 60
  - Siphons, Steam ... 111
  - Standards, Wire ... 31
- **Gages**, Altitude, Crosby ... 113
  - Ammonia, Crosby ... 112
  - Center, Lufkin ... 265
  - Compound, Crosby ... 112, 113
  - Depth, Micrometer, Lufkin ... 264
  - Depth, Rule, Lufkin ... 264
  - Draft, Ellison ... 60
  - Drill Grinding ... 265
  - Drill and Wire, Starrett ... 266
  - Fillet, Lufkin ... 265
  - Hydraulic, Crosby ... 112
  - Oil, Lunkenheimer ... 200
  - Plate, Starrett ... 266
  - Pressure, Crosby ... 112, 113
  - Radius, Lufkin ... 265
  - Recording, Taylor ... 114
  - Screw Pitch, Lufkin ... 265
  - Sheet, Starrett ... 266
  - Surface, Lufkin ... 264
  - Tap and Drill, Starrett ... 266
  - Telescoping, Lufkin ... 264
  - Test, Crosby ... 113
  - Thickness, Lufkin ... 265
  - Track ... 56
  - Vacuum, Crosby ... 112, 113
  - Water, Lunkenheimer ... 109
  - Water, Self-Cleaning ... 109
  - Wire, Starrett ... 266
- **Gages** and Protractors, Depth, Lufkin ... 264
- **Galvanized** Steel Sheets ... 13–16
  - Wire ... 31
- **Galvanizing** Pipe Extras ... 66
- **Gang** Edgers, Howell ... 463
- **Garage** Brooms ... 511
  - Forges, Champion ... 470
  - Vises, Columbian ... 287
- **Garden** Hose ... 383
  - Hose Couplings ... 388
- **Gardner-Denver** Columns, Screw .. 415
  - Governors, Engine ... 194
  - Hose Fittings ... 387
  - Oilers, Line, Air ... 415
  - Receivers, Air or Gas ... 415
  - Regulators, Speed and Pressure ... 194
  - Tanks, Pressure ... 415
- **Garnet** Cabinet Paper ... 236
  - Paper ... 236
- **Gas** Cocks, Iron Body, Walworth. 105
  - Pipe ... 61–64
  - Pumps, Leiman ... 573
  - Receivers, Gardner-Denver ... 415
  - Service Cocks ... 104
- **Gas** and Oil Engines ... 189
- **Gasket** Cutters ... 381
- **Gasketing**, Tubular ... 379

G Page

- **Gasketing** Tape ... 380
- **Gaskets**, Boiler ... 379
  - Flange, Pipe ... 380
  - Flexitallic ... 380
  - Folded, Asbestos ... 380
  - Lamp, Cap, Justrite ... 520
  - Plate, Tube ... 379
- **Gasoline** Cans, Eagle ... 204
  - Engines, Cushman ... 190
  - Hoists, Clyde ... 555
  - Hoists, Samson ... 554
  - Hoists, Vulcan ... 555
  - Lamp Suction Pumps, Coleman 500
  - Lanterns, Coleman ... 500
  - Locomotives ... 565
  - Rod Packing ... 378
- **Gas-Tight** Rubber Goggles ... 526
- **Gate** Valves, All Iron, Lunkenheimer ... 75, 77
  - Valves, Brass, Lunkenheimer .. 72–74
  - Valves, Brass, Scott ... 169
  - Valves, Brass, Walworth ... 74
  - Valves, Corrosive Service, Lunkenheimer ... 72
  - Valves, Drop-Forged Steel, Vogt 95
  - Valves, Hose, Brass ... 74
  - Valves, Iron Body, Lunkenheimer ... 74–76
  - Valves, Iron Body, Walworth. 77, 78
  - Valves, Steel, Lunkenheimer ... 94
- **Gates**, Bin, Ore ... 397
  - Blast, Champion ... 574
  - Drive ... 31
  - Farm ... 31
  - Hose, Garden ... 383
  - Molasses ... 169
  - Oil ... 169
  - Reservoir, Canal and Low Pressure ... 163
  - Walk ... 31
- **Gauge** Cocks, Compression ... 109
  - Cocks, Lunkenheimer ... 109
  - Cocks, Self-Closing ... 109
  - Cocks, Steam ... 108
  - Columns, Water ... 110
  - Glass Cutters ... 111
  - Glass Preservers ... 111
  - Glass Washers ... 111
  - Glasses ... 110, 111
  - Oil, Draft ... 60
  - Siphons, Steam ... 111
  - Standards, Wire ... 31
- **Gauges**, Altitude, Crosby ... 113
  - Ammonia, Crosby ... 112
  - Center, Lufkin ... 265
  - Compound, Crosby ... 112, 113
  - Depth, Micrometer, Lufkin ... 264
  - Depth, Rule, Lufkin ... 264
  - Draft, Ellison ... 60
  - Drill Grinding ... 265
  - Drill and Wire, Starrett ... 266
  - Fillet, Lufkin ... 265
  - Hydraulic, Crosby ... 112
  - Oil, Lunkenheimer ... 200
  - Plate, Starrett ... 266
  - Pressure, Crosby ... 112, 113
  - Radius, Lufkin ... 265
  - Recording, Taylor ... 114
  - Screw Pitch, Lufkin ... 265
  - Sheet, Starrett ... 266
  - Surface, Lufkin ... 264
  - Tap and Drill, Starrett ... 266
  - Telescoping, Lufkin ... 264
  - Test, Crosby ... 113
  - Thickness, Lufkin ... 265
  - Track ... 56
  - Vacuum, Crosby ... 112, 113
  - Water, Lunkenheimer ... 109
  - Water, Self-Cleaning ... 109
  - Wire, Starrett ... 266
- **Gauges** and Protractors, Depth, Lufkin ... 264

G

Page

- **Gauntlets**, Rubber 523
- **Gear** Brushes, Wire 510
  - Cutters, Involute 224, 225
  - Cutters, Stocking 225
- **Gears**, Bevel, Cast Iron 358
  - Helical 357
  - Herringbone 357
  - Micarta 358
  - Mitre, Cast Iron 358
  - Mortise, Cast Iron 358
  - Rawhide 358
  - Spur, Cast Iron 358
- **Gelatin**, Du Pont 419
- **Generator** Carbide 521
  - Units, Turbine, Westinghouse 187
- **Generators**, Acetylene 483
  - Sand Blast, Ruemelin 496, 497
  - Turbo, Fitz 192
- **Geologists'** Picks 430
- **Gesco** Cleaners, Tube, Boiler 57
- **Giants**, Hydraulic, Hendy 552
- **Gilbert's** Preservers, Gauge Glass 111
- **Gilsonite** Paint 181
- **Gin** Saw Filers 250
  - Saw Files 247
  - Saw Gummers 247
- **Glass**, Powdered 238
  - Welding 477, 479
- **Glass** Cutters 111
  - Cutters, Gauge 111
  - Preservers, Gauge 111
  - Washers, Gauge 111
- **Glasses**, Gauge 110, 111
  - Oil Cup, Lunkenheimer 199
- **Globe** Valves, All Iron, Lunkenheimer 89
  - Valves, Brass, Lunkenheimer 79–85
  - Valves, Brass, Scott 169
  - Valves, Brass, Standard 85
  - Valves, Brass, Walworth 85–87
  - Valves, Corrosive Service, Lunkenheimer 89
  - Valves, Drop-Forged Steel, Vogt 95
  - Valves, Iron Body, Lunkenheimer 89, 90
  - Valves, Iron Body, Walworth 91
  - Valves, Steel, Lunkenheimer 94
- **Gloves**, Acid 523
  - Rubber 523
- **Glue**, Liquid 329
  - Waterproof 328
- **Goggles**, Chemical Workers' 525
  - Chippers' 525
  - Cover-All 479, 525
  - Cover's 526
  - Dust 525
  - Grinders' 525, 526
  - Miners' 526
  - Oxweld 479
  - Riveters' 525
  - Rubber, Gas-Tight 526
  - Safety 526
  - Spectacle Type 526
  - Welding, Oxweld 479
  - Welding, Willson 479, 526
  - Willson 479, 525, 526
  - Wire Screen 526
- **Gold** Scales, Hand 578
  - Washing Pans 578
- **Gongs**, Trip 562
- **Goose** Neck Dumps 54
- **Goosenecks**, Copper Service 166
  - Lead 167
- **Gouges**, Turning, Yates-American 272
- **Goulds** Cylinders, Well 548
  - Pumps, Force, Diaphragm 545
  - Pumps, Force, Rotary 546
  - Pumps, Lift, Diaphragm 545
  - Pumps, Pressure, Hydraulic 156
  - Pumps, Rotary, Power 546
  - Pumps, Suction, Diaphragm 545
  - Rams, Hydraulic 545

G

Page

- **Goulds** Tanks, Storage, Pressure 549
- **Governors**, Engine, Gardner-Denver 194
  - Engine, Pierce 195
  - Pump, Davis 195
  - Pump, Fisher 196
- **Grab** Hooks 53
- **Grabler** Screws, Lag 151
- **Grabs**, Log, Bull-Dog 469
- **Grader** Belting 328
- **Graders**, High Lift, Rome 394
  - Motor, Rome 394
  - Rome 394
- **Grady** Wedges 272
- **Grain**, Abrasive, Alundum 237
  - Abrasive, Crystolon 237
- **Grain** Chutes 421
  - Trucks 514
- **Graphite**, Boiler 502
  - Flake 502
  - Lubricating 502
- **Graphite** Compound, Joint, Pipe 258
  - Crucibles, Dixon 583
- **Graphited** Oil, Dixon 503
- **Grate** Bars 177
- **Grates**, Boiler 177
  - Straight Bar 177
- **Gravel** Screen Wire Cloth 404
- **Gravity** Feed Containers, Imperial 508
  - Roller Conveyors 363
- **Grease**, Albany 503
  - Mine Car 503
- **Grease** Cups, Empress 198
  - Cups, Lubricating System, Alemite 197
  - Cups, Lunkenheimer 198
  - Vises, Quick-Action 288
- **Greenerd** Presses, Arbor 301
- **Greenlee** Drills, Bell Hangers' 290
- **Grinder** Tools, Diamond 244
- **Grinders**, Bench, Clizbe 245
  - Bit, Rock, Massco 417
  - Drill, Yankee 244
  - Electric 313-316
  - Electric, Yankee 244
  - Feed, Jay Bee 475
  - Floor, Clizbe 245
  - Floor, St. Louis 245
  - Floor, W. & M. 244
  - Floor, Yankee 244
  - General Purpose, Jay Bee 475
  - Hand, Luther 246
  - Hand, Milwaukee 246
  - Laboratory 580
  - Ore-Sample 580
  - Surface, W. & M. 244
- **Grinders** and Sanders, Combined, Yates-American 317
- **Grinders'** Goggles 525, 526
- **Grinding** Cutter Holders, Armstrong 232
  - Media, Ball, Rod and Pebble Mill 24
  - Rods 24
  - Wheel Dressers 244
  - Wheels, American 240–243
- **Grinding** and Lapping Compound 237
- **Grindstones**, Mounted 246
  - Unmounted 239
- **Grinnell** Bolts, Flattened End 151
  - Clamps, I-Beam 151
  - Hangers, Pipe 150
  - Rings, Pipe Hanger 150, 151
  - Rolls, Pipe 151
  - Sockets, Pipe Ring 151
  - Supports, Pipe 150
- **Grips**, Wire, Crescent 284
  - Wire, Haven 284
- **Grizzlies** 398
- **Grizzly** Screens, Robins 397
  - Steel 8
- **Grooving** Saws, Huther 293

G

Page

- **Ground** Throw Switch Stands 54
- **Guard**, Highway, Tuthill 437
- **Guard** Cable, Highway 437
  - Rail Hardware 437
  - Rail Rope 437
- **Guards**, Pant, Duck 524
  - Skull, M.S.A. 522
- **Guides**, Saw, Band, Yates-American 320
  - Saw, Howell 464
- **Gummers**, Saw, Gin 247
- **Guns**, Button Head, Alemite 197
  - Fire, Aeroil 409
  - Lubricating, Alemite 197
  - Mogul, Metallizing 495
  - Push Type, Alemite 197
  - Refractory 177
  - Spray, Imperial 506–508
- **Guy** Dropper Carbide Lamps 519
  - Wire 437
- **Gyrasphere** Crushers, Telsmith 399
- **Gyratory** Foundry Riddles 512
- **Gyrex** Screens, Robins 403

H

- **H & A** Packing, Jute 155
- **Hack** Saw Blades, Chase 165
  - Saw Blades, Milford 296, 297
  - Saw Frames, Crescent 297
  - Saw Frames, Milford 297
  - Saws, Power, Marvel 299
  - Saws, Power, Racine 300
  - Saws, Rotary, Misener 298
- **Hair** Felt 182
- **Hammer** Couplings, Air, Dixon 387
  - Drive Anchors, Diamond 49
  - Faces, Basa 474
  - Handles 271
  - Wedges 272
- **Hammers**, Babbitt Faced 474
  - Ball Pein, Kelly 473
  - Ball Pein, Non-Sparking, Stanley 270
  - Basa 474
  - Blacksmiths' 472
  - Bush 473
  - Carpenters' 271
  - Copper, Solid 474
  - Copper Faced 474
  - Cross Pein 473
  - Drilling 473
  - Driving 472
  - Hand, Blacksmiths' 472
  - Hays 165
  - Machinists' 473
  - Nail 271
  - Pile, McKiernan-Terry 410
  - Power, Little Giant 302
  - Power, Nazel 302
  - Rawhide Faced 474
  - Ripping 271
  - Riveting 473
  - Scaling 270
  - Set, Blacksmiths' 471
  - Straight Pein 473
  - Striking 473
  - Swage Bar, Disston 295
- **Hand** Blowers, Champion 470
  - Drill Points, Millers Falls 209
  - Drills, Millers Falls 288
  - Grinders, Luther 246
  - Grinders, Milwaukee 246
  - Hammers, Blacksmiths' 472
  - Jointers, Yates-American 319
  - Reamers, Cleveland 214
  - Saw Handles, Disston 292
  - Saws, Disston 292
  - Saws, Keystone 292
  - Sharpening Tools, Waugh 418
  - Stamps, Steel 272
  - Tachometers, O-Z 262

H Page

- **Hand** Tallies, Durant 262
  - Taps, Winter Bros 218
  - Winches 557
- **Handle** Specifications, Federal 271
- **Handles**, Adze 271
  - Axe 271
  - File 250
  - Hammer 271
  - Maul 271
  - Pick 271
  - Saw, Crosscut, Disston 467
  - Saw, Hand, Disston 292
  - Saw, Nest of, Disston 292
  - Shovel 428
  - Sledge 271
  - Soldering Copper 494
- **Hanger** Bearings, Shaft, Dodge-Timken 356
  - Lag Screws, Pipe 151
  - Rings, Pipe, Grinnell 150, 151
- **Hangers**, Clothes, Sanitary, Union 524
  - Conveyor, Link-Belt 371
  - Drop, Shaft, Dodge 355
  - Pipe 150, 151
  - Post, Shaft, Dodge 355
  - Trough, Link-Belt 371
- **Hardener**, Case 474, 475, 585
- **Hardesty** Gates, Reservoir, Canal and Low Pressure 163
- **Hardies**, Blacksmiths' 471
- **Hardsocg** Boxes, Powder or Dynamite 421
- **Hardware** Cloth 505
- **Hardwood** 585
- **Hargrave** Cleaners, File 250
- **Hartford** Racks, Hose 391
- **Hasp** Staples, Hinge 503
- **Hasps**, Basket 503
  - Hinge 503
  - Safety 503
- **Hasps** and Staples, Steel 503
- **Hatchet** Stakes, Pexto 308
  - Wedges 272
- **Hatchets**, Broad 272
- **Hats**, Protective, Bullard 522
- **Haulage** Rope 435, 436
- **Haven** Grips, Wire 284
- **Hay** Bale Ties 31
- **Hays** Benders, Pipe 165
  - Connections, Branch 166, 167
  - Connections, Service Pipe, Copper 166
  - Couplings, Corporation Stop 167
  - Couplings, Joint, Pipe 166
  - Faucets, Compression 168
  - Faucets, Lawn 169
  - Fittings, Pipe, Service, Copper 166–168
  - Flanging Tools, Copper Pipe 165
  - Goosenecks 166
  - Hammers 165
  - Holders, Pipe 165
  - Nuts, Service Pipe, Copper 166
  - Stops, Corporation 166, 167
  - Stops, Curb 167, 168
  - Unions 166
- **Head** Blocks, Howell 462
- **Head** and Pressure Equivalents 193
- **Headers**, Rivet 472
- **Heads**, Dado, Huther 293
  - Die, Toledo 256
  - Drilling, Auxiliary, Hoefer 228
  - Elevator, Cast Iron 373
  - Sprinkler, Lawn 390
- **Healthguard** Sand Blast Masks 496
- **Hearth-Crete** 178
- **Heaters**, Concrete, Aeroil 409
  - Feed Water, Worthington 172
  - Hot Water 172
  - Tabasco 172
  - Unit, Ilg 498, 500

H Page

- **Heating** Boilers 175
  - Stoves, Ajax 497
- **Helical** Gears 357
- **Heller** Rasps 474
- **Helmets**, Asbestos 524
  - Welding 478, 479
  - Westinghouse 478
  - Willson 478, 479
- **Helmets** and Masks, Tank Spraying 495
- **Hendy** Giants, Hydraulic 552
- **Herc-Alloy** Chain 50, 51
- **Hercules** Washers, Telsmith 401
- **Herringbone** Gears 357
- **High** Duty Valves, Brass, Lunkenheimer 85, 88
  - Temperature Packing, Asbestos 378
- **Highway** Guard, Tuthill 437
  - Guard Cable 437
- **Hill** Rams, Hydraulic 545
- **Hinge** Hasp Staples 503
  - Hasps 503
  - Nails 27
- **Hinges**, Strap 504
  - T 504
- **Hitchings**, Car, Mine 563
- **Hobs**, Barber-Colman 223
- **Hoe** Bits, Saw 294
  - Shanks, Saw 294
- **Hoefer** Heads, Drilling, Auxiliary 228
- **Hog** Beater Belting 328
- **Hoist** Drums, Capacity of 433, 555
  - Trolleys, Yale 454
- **Hoisting** Engines, Clyde 556
  - Rope 434–436
  - Winches 557
- **Hoists**, Air, Curtis 455
  - Air, Detroit 454
  - Chain, Yale 446–453
  - Electric, Detroit 453
  - Electric, Samson 554
  - Electric, Vulcan 552, 553
  - Electric, Yale 452, 453
  - Gasoline, Clyde 555
  - Gasoline, Samson 554
  - Gasoline, Vulcan 555
  - Prospectors', Vulcan 553
  - Pul-Lift, Yale 450
  - Ratchet, Yale 450
  - Steam, Vulcan 553
  - Trolley, Detroit 453
  - Trolley, Yale 451
- **Hoists** and Cranes, Floor, Portable 455
- **Holdbacks**, Robins 366
- **Holders**, Cutter, Grinding, Armstrong 232
  - Drill, Armstrong 212
  - Drill, Diamond 50
  - Electrode, Westinghouse 477
  - Felt, Justrite 520
  - Pipe, Hays 165
  - Tool, Boring, Armstrong 231
  - Tool, Carbide, Lathe, Armstrong 230
- **Hole** Diggers, Post 427, 428
  - Saws, Misener 298
- **Hollow** Chisel Mortisers, Yates-American 322
  - Chisels, Yates-American 291
  - Drill Steel 416
  - Mills, Cleveland 221
- **Hoof** Parers, Farriers' 472
- **Hook** Plates, Cast Iron 151
  - Rules, Lufkin 268
- **Hooks**, Cant 467
  - Chain 53
  - Cotton 273
  - Grab 53
  - Lug 467
  - Pail, Fire 577

H Page

- **Hooks**, Slip 53
- **Hooks** and Chain, Safety 438
- **Hoops**, Steel 6
- **Horse** Power, Belting 324
  - Power, Detachable Chain 362
  - Power, Shafting 22, 592
  - Rasps 249, 474
- **Horseshoe** Nails 474
- **Horseshoers'** Tongs 472
- **Hose**, Air 382
  - Air, Spray Painting, Imperial 509
  - Button Head, Alemite 197
  - Cotton 385, 386
  - Creamery 383
  - Drill, Air 382
  - Fire 385, 386
  - Fluid, Spray Painting, Imperial 509
  - Garden 383
  - Linen 386
  - Lubricating, Alemite 197
  - Metal, Mulconroy 385
  - Metallic, Flexible, Dynamite 384
  - Metallic, Flexible, Mulconroy 384, 385
  - Mill 386
  - Oil, Metallic, Flexible 385
  - Packers' 383
  - Pneumatic Tool 382
  - Rubber Lined 385, 386
  - Steam, Metallic, Flexible 384, 385
  - Steam, Rubber 382
  - Suction 384
  - Water, Metallic, Flexible 384
  - Water, Rubber 382, 383
  - Welding 482, 484
- **Hose** Adapters, Spray Gun, Imperial 510
  - Clamps 388
  - Connections, Spray Gun, Imperial 510
  - Coupling Bushings, Fire, ABC 388
  - Coupling Expanders, Elk 389
  - Coupling Reducers, Fire, ABC 388
  - Couplings, Expansion Ring 386, 389
  - Couplings, Garden 388
  - Couplings, Metal, Mulconroy 385
  - Couplings, Norgren 386
  - Couplings, Sherman 386
  - Couplings, Spray Gun, Imperial 510
  - Couplings, Steam 388
  - Couplings, Water 388
  - Expansion Rings 389
  - Faucets, Compression 168
  - Faucets, Ground Key 168
  - Fittings, Gardner-Denver 387
  - Gate Valves, Brass 74
  - Menders, Sherman 386
  - Nipples, Air 386
  - Nipples, Brass 388
  - Nozzles 390
  - Pipes 390
  - Racks 391
  - Reels 391
  - Spanners 389
  - Sprinklers 390
  - Stems, Air 386
  - Strainers 123
  - Valves, Brass 389
  - Washers 169
  - Washers, Rubber 388
- **Hoskins** Pyrometer Accessories 114
  - Pyrometers 114
- **Hot** Chisels, Blacksmiths' 471
  - Pressed Nuts 38
  - Water Heaters 172
- **Howe** Scales 515, 516
- **Howell** Blocks, Head 462
  - Carriers, Sawdust 465
  - Dogs, Saw Mill 462
  - Drives, Carriage, Wire Cable, Saw Mill 460

H

Page

Howell Edgers 465
  Guides, Saw 464
  Knee Attachments, Sawing 462
  Planers and Matchers 463, 464
  Saw Mills 460, 461
  Saws, Cut-Off 465
  Saws, Slab 465
  Set Works, Saw Mill 462
  Track, Steel, Saw Mill 461
  Wheels and Axles, Carriage, Saw Mill 461
Hub Unions, Malleable Iron 147
Hubbard Adzes 468
  Clips, Wire Rope 438
Hubs, Pulley, Steel, Dodge 339
Humidiguides, Taylor 115
Huntington Gauges, Track 56
Huther Heads, Dado 293
  Saws, Grooving 293
Hydrant Stops and Drains 168
  Wrenches 389
Hydrants, Compression, National 157, 159
  Fire, National 159
  Fire, Rensselaer 158
Hydrated Lime 585
Hydraulic Couplings 124
  Gauges, Crosby 112
  Giants, Hendy 552
  Jacks, Joyce 456
  Packing 379
  Pressure Pumps, Goulds 156
  Pump Oilers 203
  Rams 545
Hydro Unions, Forged Steel 147
Hydro-Carbon Burners, Cary 583
Hytempite 179, 585

I

ITP Lamps, Miners' 518
I-Beam Clamps, Grinnell 151
  Traveling Cranes, Yale 451
  Trolleys, Yale 454
I-Beams, Steel 8
Ice Band Saws, Dry, Jones 300
  Band Saws, Dry, Milford 298
Idlers, Return, Dodge 367
  Return, Dodge-Timken 367
  Return, Robins 365
  Troughing, Dodge 367
  Troughing, Dodge-Timken 367
  Troughing, Robins 364
Ilg Blowers, Ventilating 569, 570
  Blowers, Volume 571, 574
  Fans, Ventilating 499
  Heaters, Unit 498, 500
  Shutters, Automatic 499
  Ventilators, Roof 499
Imperial Adapters, Hose, Spray Gun 510
  Bib-Cocks 509
  Cocks, Cut-Off 509
  Connections, Hose, Spray Gun. 510
  Containers, Gravity Feed 508
  Containers, Pressure Feed 509
  Couplings, Hose, Spray Gun 510
  Cups, Feed, Spray Gun 508
  Fittings, S.A.E. 171
  Funnels, Aluminum 508
  Guns, Spray 506–508
  Hose, Air, Spray Painting 509
  Hose, Fluid, Spray Painting 509
  Paint Spray Outfits 506, 507
  Regulating Sets, Spray Gun 508
  Respirators 508
  Separators, Water and Oil, Spray Gun 508
  Spray Painting Equipment 506–510
  Valves, Air Adjusting 509
Inclinable Presses, Power, Niagara 301

I

Page

Increasers, Cast Iron, Water Main 153
India Oil Stones 238
Indicators, Speed, Starrett 262
  Speed, Veeder-Root 262
Industrial Casters 514
  Jacks, Simplex 457
Information, Useful 586–594
Ingot Molds 584
Injectors, Penberthy 120
Inside Micrometers, Lufkin 264
Inspectors' Shields, Westinghouse 478
  Test Pumps, Crosby 111
Insulating Cement 178–180
Insulation, Block 181
  Pipe, Sectional 183, 184
  Sheet 181
Insulation Data, Pipe 184
Inswell Chain 51
Involute Gear Cutters 224, 225
Iron Cement, Smooth-On 177
  Crusher Mortars 579
Irons, Calking 155
  Soldering, American Beauty 494
  Tuyere, Champion 470
Irrigation Information 589
Irwin Augers, Rafting 291
  Bits, Auger 290
  Bits, Car 290
  Bits, Expansive 290
  Sets, Auger Bit 290

J

Jackets, Slicker 523
Jacks, Car, Simplex 457
  Emergency, Simplex 458
  Hydraulic, Joyce 456
  Industrial, Simplex 457
  Journal, Joyce 457
  Mine, Joyce 457
  Mine, Simplex 457
  Non-Skid, Armstrong 232
  Planer, Armstrong 232
  Pull and Push, Simplex 459
  Pulling, Pole, Simplex 458
  Ratchet, Joyce 457
  Ratchet, Simplex 457, 458
  Reel, Cable, Simplex 458
  Screw, Joyce 456
  Screw, Simplex 459
  Straightening, Pole, Simplex 458
  Track, Simplex 457
  Trip 457
Jacobs Arbors, Drill Chuck 226
  Chucks, Drill 226, 227
  Chucks, Portomatic 227
Jam Nuts, Cold Punched 39
Jaw Crushers, Telsmith-Wheeling 400
Jay Bee Grinders 475
Jet Pumps, Blakeslee 122
Jewett Packing 378
Johns-Manville Cement 178–180
  Coating, Aertite 178
  Gasketing, Tubular 379
  Gaskets 379
  Insulation, Pipe, Sectional 183, 184
  Insulation, Sheet and Block 181
  Packing 376–381
  Rock Wool 182
  Tape, Gasketing 380
Joint Couplings, Pipe, Hays 166
  Graphite Compound, Pipe 258
  Runners, Lead 154
  Sealing Compound 258
Jointer Stones, Yates-American .. 239
Jointers, Hand, Yates-American .. 319
  Pipe 154
Joints, Expansion, Walworth 103
  Flexible, Moran 103
  Swing, Brass, Lunkenheimer 103
  Swing, Brass, Walworth 103
Jones Saws, Band, Power 300

J

Page

Jones Speedsters 321
Journal Jacks, Joyce 457
Joyce Jacks, Hydraulic 456
  Jacks, Journal 457
  Jacks, Mine 457
  Jacks, Screw 456
  Jacks, Trip 457
Justrite Cans, Carbide 520
  Cleaners, Tip 520
  Clips, Lamp 520
  Flasks, Carbide 520
  Lamps, Drivers' 519, 520
  Lamps, Miners' Carbide 519, 520
  Lamps, Superintendents' 519
Jute Packing 155, 379

K

K & J Trucks 513, 514
Kasenit Compound, Surface-Hardening 475
Kearney & Trecker Vises, Milling Machine 288
Kearsarge Gasketing 379
  Gasketing Tape 380
  Gaskets 379
  Packing 376, 377
Kelly Axes 468
  Hammers, Blacksmiths' 472
  Hammers, Carpenters' 471
  Hammers, Machinists' 473
  Hammers, Nail 271
  Hammers, Ripping 271
  Hatchets 272
Kerosene Lanterns, Dietz 500
Kester Solder 490
Keyhole Saw Blades, Disston 292
Keys, Center, Cleveland 226
  Cotter 42
  Service Box 159
  Woodruff 348
Keyseat Cutters, Woodruff 223
  Dimensions, Dodge 348
  Milling Machines, Burr 309
Keyseaters, Shaft, Burr 309
Keystone Posts, Drilling 212
  Ratchets 289
  Saws, Crosscut 466
  Saws, Hand 292
  Shields, Expansion 48
  Sleeves, Drill 212
Kieley Valves 163
Kimball-Krogh Pumps, Dredge 550
  Pumps, Sand and Tailings 551
King Nipples, Hose 386
Kinney Distributors, Bituminous. 406
Kits, Antidote, Cyanide Poisoning 529
  First Aid, Bullard 527–529
Klearsite Koverglas 477
Klein Blocks, Troublemen's 284
  Clamps, Wire and Sleeve 284
  Pliers 283
Knee Attachments, Saw Mill, Howell 462
  Pads, Leather 524
Knives, Farriers' 474
  Machine 323
Knock-Out Mandrels, Expanding 225
Knuckle Sheaves, Card 441
Knurling Tools, Lathe, Armstrong 232
Koverglas, Klearsite 477
Kraeuter Punches, Belt 332

L

L-R Couplings, Shaft 351
Laboratory Crushers 580
  Grinders 580
Lace Cutters, Elliott 332

L Page

Lace Leather 329
Lacing, Belt, Alligator 329
  Belt, Bristol 332
  Belt, Clipper 300
  Belt, Wire, Bristol 329
  Cut 329
Lacing Machines, Belt, Clipper 330
Ladder Shoes 501
Ladders, Duo Safety 501
  Extension 501
  Step 501
Ladles, Melting 492
Lag Bolts 34
  Screws, Pipe Hanger 151
LaMotte Comparator Outfits, Block 163
Lamp Burners, Carbide 518
  Carbide, Miners' 521
  Clips 520
  Repair Parts, Justrite 520
  Suction Pumps, Coleman 500
Lamps, Cap, Acetylene, Universal 519
  Carbide, Guy Dropper 519
  Carbide, Miners' 518–520
  Drivers', Justrite 519, 520
  Naphtha, Miners' 517
  Safety, Miners' 517
  Superintendents', ITP 518
  Superintendents', Justrite 519
Landing Chairs 558
  Dogs 558
Lansing Mixers, Concrete 408
Lanterns, Gasoline, Coleman 500
  Kerosene, Dietz 500
Lap Links, Chain 52
  Welded Casing 66
Lapping and Grinding Compound 237
Laterals, Cast Iron, Flanged, Extra Heavy 135
  Cast Iron, Flanged, Spiral Pipe 130
  Cast Iron, Flanged, Standard 131
  Cast Iron, Screwed, Extra Heavy 138
  Cast Iron, Screwed, Standard 139
  Cast Iron, Water Main 153
Lath, Metal, Expanded 16
Lath Nails, Sterilized 28
Lathe Centers, Cleveland 210
  Chucks, Cushman 228, 229
  Dogs, Armstrong 235
  Tool Holders, Armstrong 229–232
  Tool Posts, Armstrong 232
  Tools, Armstrong 229–233
Lathes, Speed, Yates-American 320
Lawn Faucets, Hays 169
  Faucets and Siamese, Combination 389
  Sprinkler Heads 390
Lead, Calking 155
  Pig 155
  Sheet 490
Lead Goosenecks 167
  Joint Runners 154
  Melting Furnaces 155
  Wool 154
Leading Wire, Du Pont 420
Leather, Lace 329
Leather Belting 325
  Knee Pads 524
  Safety Belts 524
Leathers, Cup 546
  Valve, Pump 546
Lee Chucks, Drill 225
Leetonia Adzes 431
  Drills, Post 566
  Drills, Tamp 420
  Needles, Copper 420
  Picks, Puncher 567
  Plates, Breast 567
  Tampers and Scrapers, Copper Head 420

L Page

Leetonia Wedges, Coal 567
Leg Vises, Steel 288
Leiman Blowers, Pressure 573
  Pumps, Gas 573
  Pumps, Vacuum 573
LePage's Glue 328, 329
Letters, Steel 272
Level Controllers, Fluid, Davis 101
  Controllers, Liquid, Fisher 101
Levels, Aluminum, Empire 270
  Track 56
Levels and Plumbs, Empire 270
Lever Punches, Whitney 303
Liberty Chain 51
Lift Pumps, Diaphragm, Goulds 545
  Trucks, Hand 512, 513
Light Plants, Electric, Cushman 191
Light and Power Plants, Electric, Cushman 191
Lighters, Lamp, Justrite 520
Lights, Carbide 521
Lime, Hydrated 585
Line Oilers, Air, Gardner-Denver 415
Linemen's Manila Rope 442
Linen Hose 386
  Testers 577
Lines, Chalk 273
  Masons' 273
Lining, Brake 381
  Chute 328
  Furnace 178–180
  Sluice Box 579
Lining Bars 430
Lining Up Punches 286
Linings, Trough, Conveyor, Link-Belt 368
Link-Belt, Ewart 361, 362
Link-Belt Attachments, Chain 361, 362
  Chain, Roller, Silverlink 359
  Countershaft Ends, Trough 371
  Couplings, Conveyor, Screw 370
  Drives, Silent Chain 359
  Ends, Drive, Screw Conveyor 370
  Hangers, Conveyor 371
  Hangers, Trough 371
  Linings, Trough, Conveyor 368
  Trough Ends, Conveyor 372
  Troughs, Conveyor 369
  Wheels, Sprocket 360
Links, Lap, Chain 52
  Mine Car Hitching 563
  Missing 52
  Repair, Chain 50, 52
  Repair, Feed Chain 50
Linn Tractors 396
Liquid Glue 329
  Level Controllers, Fisher 101
  Measures, Dover 205
Litharge 585
Little Giant Clips, Die 261
  Collets 260
  Dies, Bolt 261
  Hammers, Power 302
  Punches and Shears 306
  Screw Plates 259, 260
  Stocks, Die 260, 261
Littleford Salamanders 409
Load Binders, Swivel 469
Loaders, Eimco-Finlay 566
Loading, Screening and Crushing Plants, Telsmith 400
Lock Washers, Never Slip 43
  Nut, Malleable Iron 43
Locknuts, Brass 148
  Cast Iron, Standard 140
  Malleable Iron, Standard 145
  Malleable Iron, Walworth 145
Locks, Pad, Yale 504, 505
Locomotives, Gasoline 565
  Storage Battery 565
Log Chains 51
  Grabs, Bull-Dog 469

L Page

Logging Dogs, Bull-Dog 469
Long Screws 145
Longyear Drills, Core 418
Low Pressure and Canal Reservoir Gates 163
Low-Water Cutoffs, McDonnell 102, 103
Lubricant, Albany 503
Lubricated Plug Valves, Walworth 106, 107
Lubricating Equipment, Alemite 197
  Graphite 502
  Oil 503
Lubricators, Engine, Detroit 200
  Engine, Lunkenheimer 199
  Force Feed, McCord 201
  Sight-Feed, Lunkenheimer 199
Lufkin Bevels 265
  Calipers, Banner 267
  Calipers, Firm-Joint 267
  Calipers, Micrometer 263
  Clamps, Parallel 266
  Dividers, Banner 267
  Gages, Center 265
  Gages, Depth 264
  Gages, Drill Grinding 265
  Gages, Fillet 265
  Gages, Radius 265
  Gages, Screw Pitch 265
  Gages, Surface 264
  Gages, Telescoping 264
  Gages, Tickness 265
  Micrometers 263, 264
  Protractors 264
  Protractors and Depth Gages 264
  Rules, Aluminum 268
  Rules, Boxwood 268, 269
  Rules, Brass 268
  Rules, Caliper 268
  Rules, Folding 268, 269
  Rules, Hook 268
  Rules, Spring Joint 268
  Rules, Stainless 267
  Rules, Steel 267, 268
  Scribers 267
  Sets, Combination 266
  Squares, Combination 266
  Squares, Double 265
  Tape-Rules 269
  Tapes, Measuring 269
Lug Hooks 467
Lumber Crayons 273
Lu-mi-num Miners' Carbide Lamps 518, 519
Lump Chalk 238
Lunkenheimer Boiler Mountings, Application of 68, 69
  Cocks, Air 106
  Cocks, Drain 108
  Cocks, Gauge 109
  Cups, Grease 198
  Cups, Oil 198, 199
  Discs, Valve, Non-Metallic 79
  Gauges, Oil 200
  Gauges, Water 109
  Glasses, Oil Cup 199
  Joints, Swing, Brass 103
  Lubricators, Engine 199
  Lubricators, Sight-Feed 199
  Nozzles, Air 106
  Oil Controls, Constant Level 200
  Oilers, Bottle 200
  Plugs, Fusible 60
  Pumps, Oil, Hand 199
  Valves, Angle, All Iron 89
  Valves, Angle, Brass 79–85
  Valves, Angle, Iron Body 89, 90
  Valves, Blow-Off 93, 94
  Valves, Check, Brass 87, 88
  Valves, Check, Iron Body 91, 92
  Valves, Cross, Brass 80–84
  Valves, Cross, Iron Body 89, 90

L — Page

Lunkenheimer Valves,
    Ferrenewo 81, 89-91
  Valves, Gate, All Iron 75, 77
  Valves, Gate, Brass 72–74
  Valves, Gate, Corrosive Service. 72
  Valves, Gate, Iron Body 74–76
  Valves, Globe, All Iron 89
  Valves, Globe, Brass 79–85
  Valves, Globe, Corrosive
    Service 89
  Valves, Globe, Iron Body 89, 90
  Valves, High Duty, Brass....85, 88
  Valves, N-M-D 79, 87
  Valves, Needle, Brass 84, 85
  Valves, Needle, Steel 94
  Valves, Non-Return 90
  Valves, Quick-Operating,
    Brass 79, 82
  Valves, Relief 97
  Valves, Renewo, Brass..........81–84
  Valves, Safety, Pop 98
  Valves, Steel 94
  Valves, Straightway 93
  Valves, Whistle 107
  Valves, Y 93
  Washers, Oil Cup 199
  Whistles, Chime 107
  Whistles, Steam 107
Luther Grinders 246
Lutz Handles, File 250

M

M. S. A. Respirators 526
  Skullgards 522
Machine Bits, Mining 567
  Bits, Yates-American 291
  Bolts 32, 33
  Castor Oil 503
  Chain, Coal Cutting 50
  Chain, Liberty 51
  Countersinks, Cleveland 210
  Knives 323
  Screw Nuts 39
  Screw Taps, Winter Bros...... 218
  Screws 46
  Tools 304A–304D
Machinery Steel 23, 24
Machines, Blasting, Du Pont..... 420
  Collaring, Waugh 418
  Drilling, Water Main, Mueller. 154
  Drilling, Well, Star 392
  Forming, Roll, Pexto 307
  Keyseating, Shaft, Burr 309
  Lacing, Belt, Clipper 330
  Milling, Burke 309
  Milling, Keyseat, Burr 309
  Painting, Imperial 506, 507
  Pipe, Oster 252, 254
  Pipe, Oster-Williams 254
  Pipe, Toledo 250, 251
  Pipe, Williams 253, 255
  Pipe and Bolt, Tom Thumb.... 252
  Reseating, Valve, Dexter 96
  Rod, Drill, Rock, Toledo 417
  Sawing, Metal, Marvel.....299, 300
  Sawing, Metal, Racine.....299, 300
  Spraying, Imperial 506, 507
  Tapping, Allen 228
  Tapping, Alto 228
  Tapping, Mueller 154
Machinists' Clamps, Armstrong.. 235
  Hammers 473
  Hand Taps, Winter Bros........ 218
  Vises, Columbian 286
  Vises, Parker 287
Magnesia Cement 178
  Pipe Covering 183
Magnetic Separator Pulleys, C-H. 368
Magnets, Separator, C-H........ 368
Magnifiers, Coddington 577
  Pocket 577

M — Page

Magnifiers, Tripod 577
Maintenance Sets, Simplex....... 459
Malleable Iron Fittings, Ammonia 124
  Fittings, Railing 146
  Fittings, Screwed, Crane....... 141
  Fittings, Screwed, Standard.143–145
  Fittings, Screwed, Weights of. 143
Mallets, Tinners' 474
Malone Switch Stands 54
Mandrel Stakes, Pexto 308
Mandrels, Expanding, Knock-Out 225
  Saw, Champion 292
  Tube Expander, Wiedeke 58
Manhole Rings and Covers 162
Manila Rope 442
  Rope Blocks 443–445
Manufacturing Tolerances, Steel. 21
Marcy Equipment 304E–304G
Mark Unions, Forged Steel....... 147
Marvel Cutters, Rod 304
  Saws, Band, Power 300
  Saws, Hack, Power 299
  Shears, Splitting 304
Masks, Canister 527
  Fume, Willson 527
  Sand Blast 496
  Smoke, Willson 527
Masks and Helmets, Tank
    Spraying 495
Masons' Lines 273
Massco Burners, Oil 583
  Furnaces, Crucible 582
  Furnaces, Melting 582
  Grinders, Rock Bit 417
  Ovens, Drying, Sample 582
Matchers and Planers, Howell 463, 464
Mats, Floor, Rubber 381
  Rubber, Perforated 381
Matting, Cocoa 381
  Rubber 579
  Tank Bottom 381
Mattocks 429
Maul Handles 271
Mauls, Spike 431
Maximum-and-Minimum Registering
    Thermometers, Taylor 115
McCool Pulverizers 580
McCord Lubricators, Force Feed. 201
McCracken Valves, Air Relief and
    Vacuum, Combined 163
McCullough Valves, Check, Pump,
  Force Feed 201
McDaniel Tees, Suction 121
McDonnell Cutoffs, Low-
    Water 102, 103
  Feeders, Safety 102
  Safety Feeders and Cut-Offs,
    Combined 102
  Switches, Cutoff 103
McKay Chain 51
McKiernan-Terry Extractors, Pile 410
  Hammers, Pile 410
Measures, Oil, Dover 205
Measures and Funnels, Combination, Dover 205
Measures and Weights 588
Measuring Tapes, Lufkin 269
Mechanical Oil Pumps, McCord.. 201
  Shovels 566
  Stokers 173
Mechanics' Drill Sets 210
Medart Belt Tighteners, Swinging. 356
Media, Grinding, Ball, Rod and
    Pebble Mill 24
Melting Furnaces, Lead 155
  Furnaces, Massco 582
  Ladles 492
  Pots 492
Menders, Hose, Sherman 386
Mercurial Barometers, Taylor.... 113
Mercury 585
Metal, Babbitt 489

M — Page

Metal, Bearing 489
Metal Formers, Roll, Pexto....... 307
  Forming Machines, Pexto....... 307
  Hose, Mulconroy 385
  Hose Couplings, Mulconroy.... 385
  Lath, Expanded 16
  Molds 584
  Punches, Shears and Cutters,
    Combined, Pels 305
  Punches, Whitney 303
  Punches and Shears, Combined,
    Little Giant 306
  Retainer, Babbitt 490
  Sawing Machines, Marvel..299, 300
  Sawing Machines, Racine..299, 300
  Shears, Edwards 304
  Shears, Marvel 304
  Shears, Pels 306
  Shears, Throatless 307
  Slitting Saws 296
  Snips 303
  Spraying Equipment 495
Metallic Hose, Flexible,
    Dynamite 384
  Hose, Flexible, Mulconroy.384, 385
Metallizing Equipment 495, 496
  Wire, Metco 496
Metals, Perforated 403
Metco Wire, Metallizing 496
Meter Box Covers 162
  Yokes, Ford 161
Meters, Water 161
Metric Equivalents 588
Mica-Kote Roofing 17
Micarta Gears 358
Micrometer Calipers, Lufkin..... 263
  Depth Gages, Lufkin 264
Micrometers, Inside, Lufkin..... 264
Microscopes, Pencil 578
Midland Funnels 204
Milburn Lights, Carbide 521
Mild Steel 5–8
Milford Blades, Band Saw, Dry
    Ice 298
  Blades, Band Saw, Metal 298
  Blades, Band Saw, Wood 295
  Blades, Hack Saw 296, 297
  Frames, Hack Saw 297
  Saws, Band, Dry Ice 298
  Saws, Band, Metal 298
  Saws, Band, Wood 295
Mill Arbors, End, Shell, Cleveland. 221
  Brooms 511
  Hose 386
Millboard, Sheet, Asbestos 182
Millers Falls Braces, Bit 289
  Braces, Corner 289
  Drills, Breast 288
  Drills, Chain 289
  Drills, Hand 288
  Extensions, Bit 290
  Points, Drill, Hand 209
  Screwdrivers 284
Milling Cutters 221–225
  Machine Vises, Kearney &
    Trecker 288
  Machines, Burke 309
  Machines, Keyseat, Burr 309
Mills, End 221, 223
  Hollow, Cleveland 221
  Saw, Howell 460, 461
Milwaukee Brooms 511
Mine Air Cocks, Lunkenheimer.. 106
  Cages 558, 559, 562
  Car Axles 564
  Car Grease 503
  Car Hitchings 563
  Car Wheels 564
  Fans and Disc Wheels,
    Champion 573
  Jacks, Joyce 457
  Jacks, Simplex 457

M Page

- **Mine** Spike Bars, Coal 431
  - Ties, Bethlehem Steel 54
  - Ventilating Tubing 574
- **Mineral** Surfaced Asphalt Plank 406
- **Miners'** Axes 468
  - Candles 520
  - Candlesticks 520
  - Caps 521, 522
  - Carbide Lamps 518–520
  - Checks 273
  - Goggles 526
  - Lamp Carbide 521
  - Leather Belts 524
  - Naphtha Lamps 517
  - Oil Carriers 204
  - Safety Lamps 517
  - Safety Squibs, Du Pont 419
  - Scrapers 420
- **Mining** Books, Placer 578
  - Drill Steel 23
  - Machine Bits 567
  - Picks 430
- **Misener** Saws, Hack, Rotary 298
- **Missing** Links 52
- **Mitre** Gears, Cast Iron 358
- **Mittens,** Asbestos 524
- **Mixers,** Cement, Boss 408
  - Concrete, Lansing 408
- **Mobilene** Sheet Packing 376
- **Mogul** Guns, Metallizing 495
  - Packing 378
- **Moisture** Percentage Scales 517
- **Molasses** Gates 169
- **Molds,** Bullion 584
  - Crucible 584
  - Ingot 584
  - Metal 584
- **Mo-Max** Bits, Tool 234
- **Moran** Couplings, Belt 329
  - Joints, Flexible 103
- **Morehead** Traps, Steam 118
- **Morse** Tapers 587
- **Morse-Starrett** Bands, Cable 437
  - Cutters, Cable 438
- **Mortar,** Surfacing 179
- **Mortars,** Crusher, Iron 579
- **Mortars** and Pestles 579
- **Mortise** Gears, Cast Iron 358
- **Mortisers,** Hollow Chisel, Yates-American 322
- **Mortising** Chisel Bits, Yates-American 291
  - Chisels, Yates-American 291
- **Motor** Graders, Rome 394
  - Speed Reducers, Falk 357
- **Motoreducers,** Falk 357
- **Moulders'** Bellows 512
  - Brushes 511
- **Mound** Beading Tools 285
  - Cutters, Gasket and Washer 381
- **Mounted** Grindstones 246
- **Mountings,** Boiler, Lunkenheimer, Application of 68, 69
- **Mounts,** Vise, Toledo 287
- **Movers,** Car 469
- **Mueller** Boxes, Service 160
  - Drilling Machines, Water Main 154
  - Reamers, Pipe 165
  - Tapping Machines 154
- **Mulconroy** Couplings, Hose 385
  - Hose, Metal 385
  - Hose, Metallic, Flexible 384, 385
- **Mule** Shoes, Phoenix 474
- **Multiduty** Sheaves 336
- **MultiFoote** Pavers, Concrete 407
- **Multigrip** Floor Plate 10
- **Municipal** Fire Hose 385
- **Murray** Boilers 174–176
  - Engines, Steam 188
- **Myers** Outfits, Spray 510

N Page

- **N-M-D** Valves, Lunkenheimer 79, 87
- **Nail** Hammers 271
  - Pullers, S & H 272
- **Nails,** Barrel 27
  - Berry Box 28
  - Boat, Bright 27
  - Box, Cement Coated 25
  - Box, Smooth 25
  - Car, Barbed 27
  - Casing 26
  - Cement Coated 25
  - Clinch 27
  - Clout, Wire 27
  - Common, Cement Coated 25
  - Common, Copper 25
  - Common, Polished 25
  - Fence, Wire 26
  - Fine 28
  - Finishing 26
  - Flooring 26
  - Foundry, Smooth 25
  - Hinge 27
  - Horseshoe 474
  - Lath, Sterilized 28
  - Roofing, Barbed 26
  - Roofing, Felt 26
  - Shingle 26
  - Slating 25
  - Wire, Copper 25
  - Wire, Polished 25–28
- **Naphtha** Lamps, Miners' 517
- **National** Hydrants, Compression 157, 159
  - Hydrants, Fire 159
  - Washers, Street 157
- **Nazel** Hammers, Electric 302
- **Needle** Torches, C & L 493
  - Valves, Brass, Lunkenheimer 84, 85
  - Valves, Steel, Lunkenheimer 94
- **Needles,** Copper 420
- **Nelson** Pumps 541
- **Nest** of Saws, Disston 292
- **Never Slip** Lock Washers 43
- **Niagara** Meters, Water 161
  - Presses 301
  - Shears, Squaring, Foot 306
- **Nickel** Babbitt Metal 489
  - Silver Sheets 19
  - Silver Wire 19
- **Nippers,** Crestoloy 284
  - Farriers' 472
- **Nipples,** Brass 149
  - Hose, Air 386
  - Hose, Brass 388
  - Pipe 142
  - Reducing, Seamless Steel, Welding, Taylor Forge 127
  - Wrought 142
- **Nokorode** Soldering Paste 490
  - Soldering Salts 491
- **Non-Explosive** Cans 204
- **Non-Metallic** Valve Discs, Lunkenheimer 79
- **Non-Return** Valves, Lunkenheimer 90
- **Non-Skid** Jacks, Armstrong 232
- **Non-Sparking** Tools, Stanley 270
  - Wrenches, Williams 276
- **Norgren** Couplings, Hose 386
  - Stems, Hose, Air 386
- **Northwest** Contractors' Equipment 393
- **Norton** Grain, Alundum and Crystolon 237
  - Oil Stones 238, 239
- **Nozzles,** Air, Lunkenheimer 106
  - Hose 390
- **Nut,** Rivet and Bolt Cutters, Wolverene 282
- **Nut** Lock Washers, Malleable Iron 43
  - Taps, Winter Bros 219
- **Nuts,** Cold Punched 38, 39
  - Hot Pressed 38
  - Jam, Cold Punched 39
  - Lock, Brass 148
  - Lock, Cast Iron, Standard 140
  - Lock, Malleable Iron, Standard 145
  - Lock, Malleable Iron, Walworth 145
  - Machine Screw 39
  - Planer Head Bolt 323
  - S. A. E., Imperial 171
  - Semi-Finished 39
  - Service Pipe, Copper, Hays 166
  - Slotted, Semi-Finished 39
  - Stop, Elastic, Self-Locking 40
  - Stove Bolt 39
  - Thumb 40
  - Union, S. A. E., Imperial 171
  - Waste, Malleable Iron, Standard 145
  - Wing, Lamp, Justrite 520
  - Wing, Malleable Iron 40
- **Nye** Wheels, Pipe Cutter 258

O

- **O. & S.** Engines, Steam 186
- **O-Z** Tachometers, Hand 262
- **Oak** Rollers 440
- **Oakum** 155
- **Observation** Shields, Westinghouse 478
- **Oil,** Air Compressor 503
  - Castor, Machine 503
  - Cylinder 503
  - Engine 503
  - Gauge, Draft 60
  - Graphited, Dixon 503
  - Lubricating 503
  - Penetrating, Dixon 503
  - Pine 585
  - Thread-Cutting 502
- **Oil** Burners, Massco 583
  - Cans, Eagle 204
  - Carriers, Miners' 204
  - Controls, Constant Level, Lunkenheimer 200
  - Country Cocks, Iron, Walworth 104
  - Cup Glasses, Lunkenheimer 199
  - Cup Washers, Lunkenheimer 199
  - Cups, Lunkenheimer 198, 199
  - Filters, American 201
  - Filters, Burt 201
  - Gates 169
  - Gauges, Lunkenheimer 200
  - Hose, Metallic, Flexible 385
  - Measures, Dover 205
  - Pipe 61–64
  - Pumps, Hand, Lunkenheimer 199
  - Pumps, Mechanical, McCord 201
  - Stones, Norton 238, 239
  - Stones, Yates-American 239
  - Tanks, Redwood 548
- **Oil and Gas** Engines 189
- **Oil and Water** Separators, Spray Gun 508
- **Oilers,** Bench 202
  - Bottle, Lunkenheimer 200
  - Flexible Spout 203
  - Force Feed 202
  - Line, Air, Gardner-Denver 415
  - Pit Car 204
  - Pump 203
  - Railroad 202
  - Steel 202, 203
  - Valve 202
- **Oily** Waste Cans 205
- **Old Man** Drilling Posts 212
- **One-Man** Crosscut Saws, Keystone 466
- **Open** Hearth Steel 5–8
- **Ore** Bags 579

O Page

- **Ore** Bin Gates 397
  - Bucket Cars 560
  - Buckets 560
  - Cars 563
  - Sacks 579
  - Sample Grinders 580
  - Samplers 579
  - Skips 561
  - Trucks 562, 564, 565
- **Osborn** Brooms, Push 511
  - Brushes, Casting 510
  - Brushes, Dusting 510
  - Brushes, Gear 510
  - Brushes, Moulders' 511
  - Brushes, Scratch 510, 511
  - Brushes, Varnish 511
  - Brushes, Wall 511
  - Dusters 511
- **Oster** Drives, Power 252
  - Pipe Machines 252, 254
- **Oster-Williams** Pipe Machines 254
- **Outfits,** Air Compressor 411–413
  - Comparator, Block, LaMotte 163
  - Painting, Spray, Imperial 506, 507
  - Spray, Power, Myers 510
  - Welding and Cutting 480, 481
- **Ovens,** Drying, Sample, Massco 582
- **Overall** Pants, Rubber 523
  - Pants, Slicker 523
- **Oxweld** Goggles 479
- **Oxy-Acetylene** Welding Equipment and Supplies 480–488

P

- **P & B** Black Specialties 181
- **Packages,** Unit, First Aid Kit 528
- **Packers'** Hose 383
- **Packing,** Braided, Asbestos 377
  - Braided, Flax 379
  - Braided, Gasoline Rod 378
  - Braided, Jute 379
  - Braided, Mogul 378
  - Braided, Rajah 378
  - Braided, Semi-Metallic 378
  - Centripac 379
  - Coil 377–379
  - Diagonal, Cross 377
  - Flax 379
  - High Temperature, Asbestos 378
  - Hydraulic 379
  - Jewett 378
  - Jute 155, 379
  - Piston 377, 379
  - Plunger 377, 378
  - Ring 377–379
  - Rod 377, 378
  - Rope, Asbestos 380
  - Sea Ring 378
  - Sheet 376
  - Spiral 377, 379
  - Twisted, Gasoline Rod 378
  - Twisted, Mogul 378
  - Wick, Asbestos 381
  - Wick, Candle 378
- **Packing** Tools, Pilley 285
- **Padlocks,** Yale 504, 505
- **Pads,** Knee, Leather 524
- **Pail** Hooks, Fire 577
- **Pails,** Dinner, Aluminum 524, 525
  - Fire, Galvanized 577
  - Water, Galvanized 501
- **Paint,** Aluminum 181
  - Black Specialties, P & B 181
  - Boiler 181
  - Boiler and Stack 181
  - General Preservative 181
  - General Utility 181
  - Gilsonite 181
  - Protective, P & B 181
  - Protective, Quigley 180, 181
  - Stack 181

P Page

- **Paint** Spray Guns, Imperial 506–508
  - Spraying Outfits, Imperial 506, 507
  - Thinner 181
- **Painters'** Brushes, Scratch 510
- **Painting** Equipment, Spray, Imperial 506–510
  - Machines, Imperial 506, 507
  - Outfits, Spray, Imperial 506, 507
- **Pans,** Washing, Gold 578
- **Pant** Guards, Duck 524
- **Pants,** Asbestos 524
  - Fireproofed Duck 524
  - Overall, Rubber 523
  - Overall, Slicker 523
- **Paper,** Asbestos 182
  - Blasting, Rawhide 419
  - Cabinet, Garnet 236
  - Flint 236
  - Garnet 236
  - Production 236
  - Sand 236
- **Paper** Pulleys, Rockwood 337
- **Paraffin** Wax 238
- **Parallel** Clamps, Toolmakers', Lufkin 266
- **Parallel-Throw** Switch Stands 55
- **Parcel** Post Information 594
  - Post Rates 594
- **Parers,** Hoof, Farriers' 472
- **Parker** Vises, Machinists' 287
- **Parmelee** Wrenches, Pipe 280
- **Parting** Tools, Yates-American 272
- **Parts,** Air Nozzle, Lunkenheimer 106
  - Auger, Breast 567
  - Car Mover 469
  - Chuck, Portomatic, Jacobs 227
  - Clutch, Friction, Dodge 343, 345
  - Coupling, Air Hammer, Dixon 387
  - Drill, Post, Leetonia 566
  - Drill Chuck, Jacobs 226, 227
  - Ejector, Penberthy 121
  - Fire Hydrant, Rensselaer 158
  - Hoist, Chain, Differential, Yale 449
  - Hoist, Chain, Screw-Geared, Yale 448
  - Hoist, Chain, Spur-Geared, Yale 447
  - Hoist, Pul-Lift, Yale 450
  - Injector, Penberthy 120
  - Lamp, Carbide 518–520
  - Lamp, Justrite 520
  - Lamp, Safety, Wolf 517
  - Mandrel, Expanding, Knock-Out 225
  - Pipe Cutter 258
  - Saw, Hack, Rotary, Misener 298
  - Threading Tool, Armstrong Bros. 257
  - Valve, Brass, Lunkenheimer 80, 81, 83
  - Valve, Ferrenewo, Lunkenheimer 81
  - Valve, Renewo, Lunkenheimer 81, 83
  - Valve Box, Extension 157
  - Wheelbarrow 422
  - Wrench, Crescent 279
  - Wrench, Crestoloy 279
  - Wrench, Pipe, Erie 280
  - Wrench, Pipe, Ridgid 281
  - Wrench, Pipe, Stillson 281
  - Wrench, Pipe, Trimo 280
  - Wrench, Pipe, Walco 281
  - Wrench, Socket, Favorite 277
  - Wrench, Socket, Williams 278
- **Paste,** Soldering, Nokorode 490
- **Patch** Bolts, Boiler 36
- **Pavers,** Black Top, Adnun 407
  - Concrete, MultiFoote 407
- **Peavies** 467
- **Pebble,** Ball and Rod Mill Grinding Media 24
- **Pebbles,** Flint 24

P Page

- **Pedestals,** Truck 564
- **Peerless** Reamers, Cleveland 214, 216
- **Pels** Punches, Shears and Cutters, Combined 305
  - Shears, Metal 306
- **Pelton** Wheels, Water 193
- **Penberthy** Drainers, Cellar 122
  - Ejectors 121
  - Injectors 120
- **Pencil** Microscopes 578
- **Pencils,** Soapstone 273
- **Penetrating** Oil, Dixon 503
- **Penn** Caps, Miners' 521
- **Percentage** Scales, Moisture 517
- **Perforated** Metals 403
  - Rubber Mats 381
- **Pestles** and Mortars 579
- **Petro** Unions, Forged Steel 147
- **Pexto** Formers, Roll 307
  - Forming Machines, Roll 307
  - Plates, Bench 308
  - Stakes 308
- **Phoenix** Shoes, Mule 474
- **Phomene** Engines, Fire 576
- **Phosphor** Bronze Spring Sheets 19
  - Bronze Wire 19
- **Pick** Handles 271
  - Steel 24
- **Pickaroons** 467
- **Picks,** Boiler 270
  - Clay 270
  - Coal 430
  - Drifting 430
  - Geologists' 430
  - Mining 430
  - Poll 430
  - Prospecting 430
  - Puncher, Leetonia 567
  - Railroad 270, 430, 431
  - Sample 430
  - War-No 430
  - Warwood 430
- **Pieces,** Extension, Brass, Screwed 148
- **Pierce** Governors, Engine 195
- **Pig** Lead 155
- **Pile** Extractors, McKiernan-Terry 410
  - Hammers, McKiernan-Terry 410
  - Points 410
  - Protectors 410
  - Shoes 410
- **Pilley** Brushes, Boiler 56
  - Brushes, Flue 56, 57
  - Brushes and Scrapers, Flue, Combined 57
  - Packing Tools 285
  - Scrapers 57
  - Scraping Tools 285
- **Pillow** Blocks, Shaft, Dodge 351–353
  - Blocks, Shaft, Dodge-Timken 353, 354
- **Pilots,** Counterbore, Cleveland 213
- **Pin** Punches 286
  - Reamers, Taper, Cleveland 216
- **Pincers,** Farriers' 472
- **Pine** Oil 585
- **Pins,** Cotter, 42
  - Cutter, Pipe 258
  - Mine Car Hitching 563
  - Taper 36
- **Pipe,** Air 62, 575
  - Bell and Spigot, Cast Iron 152
  - Brass, Seamless 18
  - Cast Iron, Bell and Spigot 152
  - Cast Iron, Flanged 152
  - Copper, Seamless 18
  - Copperoid 61
  - Double Extra Strong 61, 62
  - Extra Strong 61, 62
  - Flanged, Cast Iron 152
  - Gas 61–64
  - Oil 61–64
  - Spiral, Taylor Forge 66

P Page

Pipe, Steam 61, 62
  Steel, Protected, Water System 67
  Stove 497
  Water 61–64
  Water, Cast Iron 152
  Water System 67
  Wrought 61–64
  Yoloy 61
  Youngstown 61–64
Pipe Benders, Hays 165
  Bolts, Grinnell 151
  Clamps, Ellis 156
  Clamps, Emergency 150
  Clamps, Walworth 156
  Couplings, Dayton 65
  Couplings, Standard 148
  Couplings, Taylor Forge 65
  Covering, Sectional 183, 184
  Cutter Pins 258
  Cutter Rollers 258
  Cutter Wheels 258
  Cutters, Armstrong Bros 258
  Cutters, Barnes 258
  Cutters, Cast Iron 154
  Cutters, Trimo 258
  Cutting 61
  Dies, Armstrong Bros 257
  Extras, Dipped 66
  Extras, Galvanizing 66
  Fabricating 61
  Fitting 61
  Fittings, Brass, Screwed ... 148, 149
  Fittings, Brass, Walworth 149
  Fittings, Cast Iron, Flanged, Extra Heavy 134–137
  Fittings, Cast Iron, Flanged, Spiral Pipe 130
  Fittings, Cast Iron, Flanged, Standard 130–134
  Fittings, Cast Iron, Screwed, Extra Heavy 138, 141
  Fittings, Cast Iron, Screwed, Standard 138–141
  Fittings, Cast Iron, Screwed, Weights of 138
  Fittings, Cast Iron, Water Main 152, 153
  Fittings, Dayton 65
  Fittings, Drop-Forged Steel, Screwed, Vogt 125
  Fittings, Malleable Iron, Screwed, Crane 141
  Fittings, Malleable Iron, Screwed, Standard 143–145
  Fittings, Malleable Iron, Screwed, Weights of 143
  Fittings, Seamless Steel, Welding, Taylor Forge 126, 127
  Fittings, Service, Copper, Hays 166–168
  Flange Gaskets 380
  Flanging Tools, Copper, Hays .. 165
  Hanger Lag Screws 151
  Hanger Rings, Grinnell 150, 151
  Hangers 150, 151
  Holders, Hays 165
  Information 588, 590
  Insulation Data 184
  Joint Couplings, Hays 166
  Joint Graphite Compound 258
  Jointers 154
  Machines, Oster 252, 254
  Machines, Oster-Williams 254
  Machines, Toledo 250, 251
  Machines, Williams 253, 255
  Nipples 142
  Plugs, Ellis 156
  Railings 146
  Reamers, Mueller 165
  Reamers, Toledo 217
  Reamers, Winter Bros 219
  Ring Sockets, Grinnell 151

P Page

Pipe Rolls, Grinnell 151
  Saddles 153, 156
  Stocks and Dies, Armstrong Bros 257
  Stocks and Dies, Toledo 256, 257
  Strainers 123
  Straps 151
  Supports, Grinnell 150
  Tap Drill List 220
  Tap Drill Sizes 592
  Taps, Winter Bros 219
  Thread Information 587
  Threading 61
  Tongs, Williams 282
  Vise Mounts and Supports, Toledo 287
  Vises, Columbian 287
  Vises, Combination, Columbian . 287
  Vises, Toledo 287
  Vises, Trimo 287
  Wrenches, Erie 280
  Wrenches, Parmelee 280
  Wrenches, Ridgid 281
  Wrenches, Stillson 281
  Wrenches, Trimo 280
  Wrenches, Walco 281
Pipe and Bolt Machines, Tom Thumb 252
Pipemaster Wrenches, Erie 280
Pipes, Blow 480–482
  Hose 390
Piston Packing 377, 379
Pit Caps, Miners' 521
  Car Oilers 204
Placer Mining Books 578
Plain Faucets, Compression 168
  Faucets, Ground Key 168
  Milling Cutters 222
Planer Head Bolts 323
  Jacks, Armstrong 232
  Tools, Armstrong 231
Planers and Matchers, Howell . 463, 464
Plank, Asphalt, Mineral Surfaced. 406
Plants, Crushing, Loading and Screening, Telsmith 400
  Light, Electric, Cushman 191
  Light and Power, Electric, Cushman 191
Plaques, Vanning, Richards 578
Plastic Compound, Asphalt 181
  Fire Brick 179
  Surfacing Mortar 179
Plate, Floor, Multigrip 10
Plate Feeders, Telsmith 397
  Gages, Starrett 266
  Gaskets, Tube 379
  Shears, Metal, Pels 306
Plates, Bench, Pexto 308
  Breast, Leetonia 567
  Hook, Cast Iron 151
  Screw, Little Giant 259, 260
  Steel 9
Platform Scales 514–516
  Trucks 514
Platforms, Skid 513
Pliers, Cee-Tee-Co 283
  Crescent 283, 284
  Crestoloy 283
  Klein 283
  S & H 283
Plow Bolts 35
Plows, Road 394
Plug Valves, Lubricated, Walworth 106, 107
Plugs, Brass, Screwed 148, 149
  Brass, Walworth 149
  Cast Iron, Screwed, Extra Heavy 138
  Cast Iron, Screwed, Standard .. 140
  Cast Iron, Water Main 152, 153
  Fusible, Lunkenheimer 60
  Malleable Iron, Ammonia 124

P Page

Plugs, Pipe, Ellis 156
  Steel, Screwed, Vogt 125
Plumbers' Oakum 155
Plumbs and Levels, Empire 270
Plunger Packing 377, 378
Pneumatic Hoists, Curtis 455
  Hoists, Detroit 454
  Hose Nipples 386
  Hose Stems 386
  Tire Disc Wheels 422
  Tool Hose 382
  Tools 413, 414
Pocket Magnifiers 577
  Scribers, Lufkin 267
  Transits, Brunton 578
Points, Drill, Diamond 50
  Drill, Hand, Miller Falls 209
  Pile 410
Pole Pulling Jacks, Simplex 458
  Saw Frames 466
  Straightening Jacks, Simplex .. 458
Polishers, Electric 311
Polishing Stands, Clizbe 246
  Wheels, Felt 239
Poll Picks 430
Pop Relief Valves, Air-Gas, Lunkenheimer 97
  Safety Valves, Lunkenheimer .. 98
Porta Conveyors, Trough 396
Portable Drills, Electric 310, 311
  Fire Box Boilers 176
  Floor Cranes and Hoists 455
  Forges, Champion 470
Porter Clippers, Bolt 282
  Cutters, Swivel Head 282
Porter-Cable Edgers 318
  Sanders, Floor 318
  Sanders, Take-About 318
Portomatic Chucks, Jacobs 227
Post Bearings, Shaft, Dodge 355
  Drills, Champion 317
  Drills, Leetonia 566
  Hangers, Shaft, Dodge 355
  Hole Diggers 427, 428
  Information, Parcel 594
  Rates, Parcel 594
Posts, Drilling, Keystone 212
  Fence 29
  Tee 29
  Tool, Lathe, Armstrong 232
Pots, Fire, C & L 493
  Melting 492
  Solder, Electric, Westinghouse . 492
  Tallow 203
Poultry Fence 29
Powder, Blasting, Du Pont 419
Powder Bags, Du Pont 421
  Boxes, Hardsocg 421
Power Boilers 174, 175
  Drives, Oster 252
  Drives, Toledo 251
  Hammers, Little Giant 302
  Hammers, Nazel 302
  Pumps 532–534, 546
  Shovels, Northwest 393
  Spray Outfits, Myers 510
  Units 189
Power and Electric Light Plants, Cushman 191
Preformed Wire Rope 432
Preservative, Belt 328
Preserver, Rope, Wire 437
Preservers, Glass, Gauge 111
Press Ram Crimps 547
Presses, Arbor, Greenerd 301
  Drill, Champion 316, 317
  Inclinable, Power, Niagara 301
Pressure Blowers, Champion 571
  Blowers, Leiman 573
  Blowers, Roots-Connersville . 571, 574
  Blowers, Victor-Acme 572
  Feed Containers, Imperial 509

P Page

Pressure Gauges, Crosby 112, 113
  Pumps, Hydraulic, Goulds 156
  Reducing Valves, Davis 100
  Reducing Valves, Fisher 99
  Reducing Valves, Strong 100
  Regulating Valves, Davis 99
  Regulating Valves, Strong 98
  Regulators, Davis 99
  Regulators, Strong 98
  Storage Tanks, Goulds 549
  Tanks, Gardner-Denver 415
Pressure and Head Equivalents .. 193
Pressure and Speed Regulators, Gardner-Denver 194
Pressures Working, Wrought Pipe 590
Primary Breakers, Telsmith 399
Priming Centrifugal Pumps 586
Production Paper 236
  Saws, Shear-Cut, Racine 299
Proof Coil Chain 51
Property Protection Fence 29
Prospecting Picks 430
Prospector Core Drills, Longyear. 418
Prospectors' Hoists, Vulcan 553
  Winches 557
Protected Steel Pipe, Water System 67
Protective Apparel 521–524
  Coating, P & B 181
  Paint, Quigley 180, 181
Protectors, Flame, Lamp, Justrite 520
  Pile 410
Protractors, Lufkin 264
Protractors and Depth Gages, Lufkin 264
Pruning Saw Blades, Disston 292
Prussian Blue 237
Pry Bars 270
Psychrometers, Taylor 113
Pull Shovels, Power, Northwest .. 393
Pull and Push Jacks, Simplex ... 459
Pullers, Nail, S & H 272
Pulley Bushings, Tight and Loose 341
  Clutches, Dodge 342–347
  Dimensions, Steel, Split, Dodge 340
  Hubs, Steel, Dodge 339
Pulleys, Cast Iron, Solid 341
  Cast Iron, Split 341
  Conveyor, Dodge 341
  Manila Rope 443–445
  Paper, Rockwood 337
  Rockwood 337
  Separator, Magnetic, C-H 368
  Steel, Split, Dodge 338–340
  Wire Rope 444, 445
Pul-Lift Hoists, Yale 450
Pulling Jacks, Pole, Simplex 458
  Winches 557
Pulverizers, McCool 580
Pumice Stone 238
Pump Diaphragms, Rubber 547
  Governors, Davis 195
  Governors, Fisher 196
  Information 586–589
  Oilers 203
  Rod 547
  Rod Couplings 547, 548
  Rods, Steel 547
  Rods, Wood 547
  Tanks, Fire, Accurate 577
  Valve Attachments, Reseater, Dexter 96
  Valve Leathers 546
  Valves, Belmont 547
Pumping Systems, Water 543, 544
Pumps, Bilge, Blakeslee 122
  Centrifugal 534–541
  Centrifugal, Priming 586
  Dredge, Kimball-Krogh 550
  Force, Diaphragm, Goulds 545
  Force, Rotary, Goulds 546
  Gas, Leiman 573

P Page

Pumps, Jet, Blakeslee 122
  Lift, Diaphragm, Goulds 545
  Oil, Hand, Lunkenheimer 199
  Oil, Mechanical, McCord 201
  Power 532–534, 546
  Pressure, Hydraulic, Goulds 156
  Rotary, Force, Goulds 546
  Rotary, Power, Goulds 546
  Sand and Tailings, Kimball-Krogh 551
  Sinking, Cameron 550
  Steam 530, 531
  Suction, Diaphragm, Goulds 545
  Suction, Lamp, Coleman 500
  Sump 540, 541
  Test, Hydraulic, Goulds 156
  Test, Inspectors', Crosby 111
  Turbine 542
  Vacuum, Leiman 573
  Water System 543, 544
Pumps and Receivers, Boiler Feed 531
Puncher Picks, Leetonia 567
Punches, Arch 285
  Backing Out 471
  Belt 332
  Blacksmiths' 471
  Center 286
  Channel Iron, Whitney 303
  Lever, Whitney 303
  Lining Up 286
  Metal, Whitney 303
  Pin 286
  Rail 55
  Repair 286
  Screw, Steel 303
  Shears and Cutters, Combined, Pels 305
  Track 431
Punches and Shears, Combined, Little Giant 306
Push Brooms 511
  Type Fittings, Alemite 197
  Type Guns, Alemite 197
Push and Pull Jacks, Simplex ... 459
Putty 238
Pyrene Extinguishers, Fire 576
Pyrometer Accessories, Hoskins .. 114
Pyrometers, Hoskins 114

Q

Q-Chromastic 179
Q-Chrome 179
Q-Seal Joint Compound 258
Queen City Shears, Squaring 306
Quick-Action Vises, Greene 288
Quick-Hook-Up Low-Water Cutoffs, McDonnell 102, 103
  Safety Feeders, McDonnell 102
Quick-Operating Valves, Brass, Lunkenheimer 79, 82
Quicksilver 585
Quigley Cast-Refract 179
  Cement 178, 179
  Coating, Protective 180, 181
  Compound, Joint 258
  Fire Brick 179
  Guns, Refractory 177
  Hearth-Crete 178
  Q-Chromastic 179
  Q-Chrome 179

R

R & H Case Hardener 474
Racine Saws, Hack, Power 300
  Saws, Shear-Cut 299
Racks, Hose 391
Radius Gages, Lufkin 265
Rafting Augers, Irwin 291
  Axes 468
  Dogs, Chain 469

R Page

Rags, Wiping 205
Rail Benders, Chicago 55
  Benders, Umeco 56
  Forks 56
  Hardware, Guard 437
  Hugger Chain Hoists, Yale 451
  Information 53
  Punches 55
  Rope, Guard 437
  Tongs 56
Railing Fittings, Malleable Iron .. 146
Railings, Pipe 146
Railroad Adzes 468
  Crayons 273
  Oilers 202
  Picks 270, 430, 431
  Spike Mauls 431
  Trucks 513
  Wrenches, Williams' 280
Rails, Steel 53
Railway Track Drills 56
Rajah Packing 378
Rakes, Asphalt 429
  Road 429
  Tar 429
Ram Crimps, Press 547
Rams, Hydraulic 545
Rasps, Cabinet 249
  Delta 248, 249
  Heller 474
  Horse 249, 474
  Shoe 249
  Wood 248, 249
Ratchet Bit Braces, Millers Falls 289
  Drills, Keystone 289
  Hoists, Yale 450
  Jacks, Joyce 457
  Jacks, Simplex 457, 458
  Pipe Reamers, Toledo 217
  Screwdrivers, Millers Falls 284
  Stocks and Dies, Pipe, Toledo 256, 257
  Twist Drills, Square Shank 209
  Wrenches, Favorite 277
  Wrenches, Williams 279
Ratchets, Boiler, Keystone 289
  Drilling, Keystone 289
Rates, Parcel Post 594
Rawhide Blasting Paper 419
  Faced Hammers 474
  Gears 358
Rawlplug Anchors, Screw 48
Reamer Arbors, Shell, Cleveland Peerless 217
  Sets, Adjustable, Cleveland 215
Reamers, Adjustable, Cleveland .. 215
  Bridge, Taper, Cleveland 215
  Burring, Cleveland 217
  Chucking, Cleveland Peerless .. 214
  Expansion, Cleveland 214
  Expansion, Cleveland Peerless. 214
  Hand, Cleveland 214
  Pin, Taper, Cleveland 216
  Pipe, Mueller 165
  Pipe, Toledo. 217
  Pipe, Winter Bros 219
  Shell, Cleveland 216
  Shell, Cleveland Peerless 216
  Tip, Lamp, Justrite 520
Receivers, Air, Gardner-Denver .. 415
  Gas, Gardner-Denver 415
Receivers and Boiler Feed Pumps. 531
Recording Gauges, Taylor 114
  Thermometers, Taylor 114
Red Devil Glass Cutters 111
Red Star Carts, Concrete 421
  Chutes 421
  Wheelbarrows 422
Reducer Couplings, Pump Rod 548
Reducers, Brass, Screwed 148

R Page

- **Reducers**, Cast Iron, Flanged, Extra Heavy 135
  - Cast Iron, Flanged, Spiral Pipe. 130
  - Cast Iron, Flanged, Standard 131
  - Cast Iron, Screwed, Extra Heavy 138
  - Cast Iron, Screwed, Standard 140
  - Cast Iron, Water Main 153
  - Copper, Sweat, Chase 171
  - Coupling, Hose, Fire, ABC 388
  - Malleable Iron, Ammonia 124
  - Malleable Iron, Screwed, Crane 141
  - Malleable Iron, Screwed, Standard 145
  - Speed, Falk 356, 357
- **Reducing** Fittings, Brass, Screwed 148, 149
  - Fittings, Brass, Walworth 149
  - Fittings, Cast Iron, Flanged, Extra Heavy 134–137
  - Fittings, Cast Iron, Flanged, Spiral Pipe 130
  - Fittings, Cast Iron, Flanged, Standard 130–133
  - Fittings, Cast Iron, Screwed, Extra Heavy 138
  - Fittings, Cast Iron, Screwed, Standard 138–140
  - Fittings, Malleable Iron, Ammonia 124
  - Fittings, Malleable Iron, Screwed, Standard 143–145
  - Fittings, Seamless Steel, Taylor Forge 126, 127
  - Nipples, Seamless Steel, Welding, Taylor Forge 127
  - Valves, Davis 100
  - Valves, Fisher 99
  - Valves, Strong 100
- **Reel** Jacks, Cable, Simplex 458
- **Reels**, Hose 391
- **Refills**, First Aid Kit 528
- **Refractory** Cement 178–180
  - Guns 177
  - Surfacing Mortar 179
- **Refrigerator** Thermometers, Taylor 118
- **Registering** Thermometers, Maximum-and-Minimum, Taylor 115
- **Regulating** Sets, Spray Gun, Imperial 508
  - Valves, Pressure, Davis 99
  - Valves, Pressure, Strong 98
- **Regulators**, Pressure, Davis 99
  - Pressure, Strong 98
  - Speed and Pressure, Gardner-Denver 194
- **Reinforcing** Bars 5
- **Relief** Valves, Altitude, Kieley 163
  - Valves, Lunkenheimer 97
- **Relief** and Vacuum Valves, Air, Combined, McCracken 163
- **Renewo** Valves, Brass, Lunkenheimer 81–84
- **Rensselaer** Hydrants, Fire 158
  - Sleeves, Tapping 155
  - Valves, Tapping 155
  - Valves, Water Works 157
- **Repair** Links, Chain 50, 52
  - Links, Feed Chain 50
  - Parts, Air Nozzle, Lunkenheimer 106
  - Parts, Auger, Breast 567
  - Parts, Car Mover 469
  - Parts, Chuck, Portomatic, Jacobs 227
  - Parts, Clutch, Friction, Dodge 343, 345
  - Parts, Coupling, Air Hammer, Dixon 387
  - Parts, Drill, Post, Leetonia 566
  - Parts, Drill Chuck, Jacobs 226, 227

R Page

- **Repair** Parts, Ejector, Penberthy 121
  - Parts, Fire Hydrant, Rensselaer 158
  - Parts, Hoist, Chain, Differential, Yale 449
  - Parts, Hoist, Chain, Screw-Geared, Yale 448
  - Parts, Hoist, Chain, Spur-Geared, Yale 447
  - Parts, Hoist, Pul-Lift, Yale 450
  - Parts, Injector, Penberthy 120
  - Parts, Lamp, Carbide 518–520
  - Parts, Lamp, Justrite 520
  - Parts, Lamp, Safety, Wolf 517
  - Parts, Mandrel, Expanding, Knock-Out 225
  - Parts, Pipe Cutter 258
  - Parts, Saw, Hack, Rotary, Misener 298
  - Parts, Threading Tool, Armstrong Bros. 257
  - Parts, Valve, Brass, Lunkenheimer 80, 81, 83
  - Parts, Valve, Ferrenewo, Lunkenheimer 81
  - Parts, Valve, Renewo, Lunkenheimer 81, 83
  - Parts, Valve Box, Extension 157
  - Parts, Wheelbarrow 422
  - Parts, Wrench, Crescent 279
  - Parts, Wrench, Crestoloy 279
  - Parts, Wrench, Pipe, Erie 280
  - Parts, Wrench, Pipe, Ridgid 281
  - Parts, Wrench, Pipe, Stillson 281
  - Parts, Wrench, Pipe, Trimo 280
  - Parts, Wrench, Pipe, Walco 281
  - Parts, Wrench, Socket, Favorite 277
  - Parts, Wrench, Socket, Williams 278
  - Punches 286
- **Replaces** Car, Alexander 56
- **Repointers**, Dipper Tooth, Amsco 488
- **Reseaters**, Bibb, Skinner 95, 96
  - Faucet, Skinner 95, 96
  - Utility, Skinner 96
  - Valve, Dexter 96
  - Valve, Skinner 96
- **Reservoir** Gates, Canal and Low Pressure 163
- **Respirators**, Air-Fed 496
  - Bag 527
  - Dustite 526
  - M.S.A. 526
  - Rubber 526
  - Spray Dust, Imperial 508
  - Willson 526, 527
- **Retainer**, Babbitt Metal 490
- **Re-Threading** Dies, GTD 261
- **Retorts** 579
- **Return** Bends, Brass, Screwed 148
  - Bends, Cast Iron, Screwed, Standard 140
  - Bends, Malleable Iron, Ammonia 124
  - Bends, Malleable Iron, Screwed, Crane 141
  - Bends, Malleable Iron, Screwed, Standard 145
  - Bends, Seamless Steel, Welding, Taylor Forge 127
  - Bends, Wrought Steel, Ammonia 124
  - Idlers, Dodge 367
  - Idlers, Dodge-Timken 367
  - Idlers, Robins 365
- **Revolution** Counters, Starrett 262
  - Counters, Veeder-Root 262
- **Rex** Bits, Tool Holder 233, 234
  - Tool Steel 233
- **Richards**, Vanning Plaques 578
- **Riddles**, Foundry 512
- **Ridge** Roll 17
- **Ridgid** Wrenches, Pipe 281

R Page

- **Rims**, Sprocket, Valve Wheel, Babbitt 72
- **Ring Dogs** 469
  - Packing 377–379
  - Sockets, Pipe, Grinnell 151
- **Rings**, Clutch, Friction, Dodge 343
  - Expansion, Hose 389
  - Pipe Hanger, Grinnell 150, 151
- **Rings and Covers**, Coal-Hole 162
  - Manhole 162
  - Sewer 162
- **Ripping** Bars 431
  - Hammers 271
- **Rivet**, Nut and Bolt Cutters, Wolverene 282
- **Rivet** Busters 472
  - Extractors, Crescent 331
  - Forges, Champion 470
  - Headers 472
  - Sets 472
  - Tongs 472
- **Riveters'** Goggles 525
- **Riveting** Hammers 473
- **Rivets**, Belt 40
  - Belt, Crescent 331
  - Boiler 41
  - Coopers' 42
  - Copper 40
  - Small 41
  - Steel 41
  - Structural 41
  - Tinners' 42
- **Road** Plows 394
  - Rakes 429
- **Roadway** Boxes 159
- **Robins** Belt Trainers 364
  - Conveyors, Belt 363
  - Holdbacks 366
  - Idlers, Return 365
  - Idlers, Troughing 364
  - Screen Surfaces 402
  - Screens, Grizzly 397
  - Screens, Gyrex 403
  - Take-Ups 365
- **Rock** Bit Grinders, Massco 417
  - Drill Bits, Timken 416
  - Drill Rod Machines, Toledo 417
  - Drill Steel 23
  - Drills 414
  - Wool 182
- **Rockwood** Pulleys 337
- **Rod**, Pebble and Ball Mill Grinding Media 24
  - Pump 547
- **Rod** Couplings, Pump 547, 548
  - Couplings, Sucker 547
  - Couplings, Wood 547
  - Cutters, Marvel 304
  - Machines, Drill, Rock, Toledo. 417
  - Packing 377, 378
- **Rods**, Bessemer Steel 23
  - Brass 17
  - Copper 19
  - Drill 23
  - Grinding 24
  - Pump, Steel 547
  - Pump, Wood 547
  - Stay 37
  - Welding 485–488
- **Roll**, Ridge 17
- **Roll** Board, Asbestos 182
  - Brass 490
  - Formers, Pexto 307
  - Forming Machines, Pexto 307
  - Roofing 17
  - Valley, Galvanized 17
- **Roller** Chain, Silverlink, Link-Belt 359
  - Conveyors, Gravity 363
  - Supports, Toledo 287
- **Rollers**, Card 440, 441
  - Cutter, Pipe 258

R Page

Rollers, Oak 440
  Rope 440, 441
  Slope 440, 441
  Track 440, 441
  Track Rope 440
  Tube, Wiedeke 58
Rolls, Pipe, Grinnell 151
Rome Graders 394
Roof Coating 181
  Ventilators, Ilg 499
Roofing, Carey 17
  Mica-Kote 17
  Roll 17
  Steel, Corrugated 16
Roofing Fasteners, Sheet 26
  Nails, Barbed 26
  Nails, Felt 26
  Table 16
Roots-Connersville Blowers,
  Pressure 571, 574
  Exhausters 571
Rope, Elevator 435
  Haulage 435, 436
  Hoisting 434–436
  Manila 442
  Rail, Guard 437
  Sand Line 435
  Tiller 436
  Transmission, Manila 442
  Wire 432–437
Rope Clips, Wire 438
  Oakum 155
  Packing, Asbestos 380
  Preserver, Wire 437
  Pull Information 591
  Rollers 440, 441
  Sheaves, Card 439, 441
  Sockets, Wire 438
  Thimbles, Wire 438
Rope-A-Lene 437
Rosin 238
Rosin-Filled Solder 490
Ro-Tap Shakers, Sieve, Testing 581
Rotary Hack Saws, Misener 298
  Pumps, Force, Goulds 546
  Pumps, Power, Goulds 546
Rotten Stone 238
Round Belt Couplings, Moran 329
  Belt Punches 332
  Leather Belting 325
Routers, Yates-American 322
Rowell Ladles, Melting 492
Rubber Amalgam Scrapers 578
  Belting 325–327
  Boots 523
  Coats 523
  Gloves 523
  Goggles, Gas-Tight 526
  Lined Hose 385, 386
  Mats, Perforated 381
  Matting 579
  Overall Pants 523
  Pump Diaphragms 547
  Respirators 526
  Sheet Packing 376
Rubbers, Band Saw Wheel,
  Yates-American 319
Rubbing Bricks 239
Ruemelin Generators, Sand
  Blast 496, 497
Rule Depth Gages, Lufkin 264
Rules, Aluminum, Lufkin 268
  Boxwood, Lufkin 268, 269
  Brass, Lufkin 268
  Caliper, Lufkin 268
  Folding, Lufkin 268, 269
  Hook, Lufkin 268
  Spring Joint, Lufkin 268
  Stainless, Lufkin 267
  Steel, Lufkin 267, 268
  Tape, Lufkin 269
Runners, Joint, Lead 154

R Page

Russell Plows, Road 394
  Scrapers 394
Rust Solvent, Dixon 503

S

S Wrenches, Adjustable, Westcott 280
S. & A. Microscopes 578
S.A.E. Fittings, Imperial 171
  Screw Stock 21
  Shafting 21
  Steel Specifications 20
S & H Chisels 286
  Pliers 283
  Pullers, Nail 272
  Punches 286
  Screwdrivers 285
S & W Cutters, Valve 96
Sacks, Ore 579
Saddles, Pipe 153, 156
Safety Belts, Leather 524
  Cans 204
  Feeders, McDonnell 102
  Feeders and Cut-Offs, Combined,
  McDonnell 102
  Fuse 419
  Goggles 526
  Hasps 503
  Lamps, Miners' 517
  Squibs, Miners', Du Pont 419
  Valves, Iron Body, Walworth 98
  Valves, Pop, Lunkenheimer 98
  Wrenches, Williams 276
Sager Axes 468
St. Louis Grinders, Floor 245
Salamanders 409
Salem Buckets, Elevator 374
Salts, Soldering, Allen 491
  Soldering, Nokorode 491
Sample Drying Ovens, Massco 582
  Picks 430
Samplers, Ore 579
Samson Crushers, Laboratory 580
  Hoists 554
  Movers, Car 469
  Spot Sash Cord 442
Sand Blast Generators,
  Ruemelin 496, 497
  Blast Masks 496
  Chutes 421
  Driers, Sutton 409
  Line Rope 435
  Paper 236
Sand and Tailings Pumps, Kimball-
  Krogh 551
Sanders, Electric, Portable 311, 312
  Floor, Porter-Cable 318
  Take-About, Porter-Cable 318
  Yates-American 322
Sanders and Grinders, Combined,
  Yates-American 317
Sanitary Clothes Hangers, Union. 524
Sasgen Winches 557
Sash Cord, Samson Spot 442
  Cord, Wire 436
Saw Attachments, Tractor 466
  Bits, Hoe 294
  Blades, Band, Dry Ice, Milford. 298
  Blades, Band, Metal, Milford 298
  Blades, Band, Metal, Wide 294
  Blades, Band, Wood, Milford 295
  Blades, Compass, Disston 292
  Blades, Hack, Chase 165
  Blades, Hack, Milford 296, 297
  Blades, Keyhole, Disston 292
  Blades, Pruning, Disston 292
  Clamps 295
  Filers, Gin 250
  Files, Gin 247
  Frames, Diamond 466
  Frames, Hack, Crescent 297
  Frames, Hack, Milford 297

S Page

Saw Guides, Band, Yates-
  American 320
  Guides, Howell 464
  Gummers, Gin 247
  Handles, Crosscut, Disston 467
  Handles, Hand, Disston 292
  Handles, Nest of, Disston 292
  Mandrels, Champion 292
  Mill Carriage Wheels and
  Axles, Howell 461
  Mill Dogs, Howell 462
  Mill Head Blocks, Howell 462
  Mill Knee Attachments, Howell. 462
  Mill Set Works, Howell 462
  Mill Steel Track, Howell 461
  Mill Wire Cable Carriage
  Drives, Howell 460
  Mills, Howell 460, 461
  Sets, Disston 295
  Sets, Stearns 295
  Shanks, Hoe 294
  Swages, Disston 295
  Tables, Jones 321
  Wedges 469
Sawdust Carriers, Howell 465
Sawing Machines, Metal,
  Marvel 299, 300
  Machines, Metal, Racine 299, 300
Saws, Band, Dry Ice, Jones 300
  Band, Dry Ice, Milford 298
  Band, Metal, Milford 298
  Band, Metal, Wide 294
  Bands, Power, Jones 300
  Band, Power, Marvel 300
  Band, Power, Yates-American. 319
  Band, Wood, Milford 295
  Circular 292–294
  Cordwood 292
  Crosscut, Disston 466, 467
  Crosscut, Keystone 466
  Cut-Off, Howell 465
  Docking, Disston 466
  Electric 312, 313
  Grooving, Huther 293
  Hack, Power, Marvel 299
  Hack, Power, Racine 300
  Hack, Rotary, Misener 298
  Hand, Disston 292
  Hand, Keystone 292
  Hole, Misener 298
  Nest of, Disston 292
  Production, Shear-Cut, Racine 299
  Slab, Howell 465
  Slitting, Metal 296
  Variety, Yates-American 321
Scales, Beam and Frame 515
  Cotton 515
  Counter 516
  Depot 515
  Gold, Hand 578
  Percentage, Moisture 517
  Platform 514–516
  Solution 517
  Spring 516
  Truck 515
  Wagon 515
  Warehouse 515
  Wheelbarrow, Portable 514
Scaling Hammers 270
Schieren Cement, Belt 328
Schubert-Christy Towers, Spray 173
Scoops, Spades and Shovels 423–427
Scott Stops, Compression 169
  Valves, Angle, Brass 169
  Valves, Check, Brass, Swing 169
  Valves, Gate, Brass 169
  Valves, Globe, Brass 169
Scrapers, Alton 420
  Amalgam, Rubber 578
  Atlas 395
  Bearing, Pilley 285
  Drag 394

S Page
Scrapers, Flue 57
  Fresno 394
  Miners' 420
  Tube 57
Scrapers and Brushes, Flue, Combined 57
Scrapers and Tampers, Copper Head 420
Scraping Tools, Pilley 285
Scratch Brushes, Wire 510, 511
Screen Cloth, Robins 402
  Cloth, Wire 402–406, 505
Screening, Loading and Crushing Plants, Telsmith 400
Screens, Coal 397
  Coke 397
  Dry, Telsmith 401
  Grizzly, Robins 397
  Gyrex, Robins 403
Screw Anchors, Cinch 49
  Anchors, Diamond 49
  Anchors, Rawlplug 48
  Caps, Lamp, Justrite 520
  Clamps, Armstrong 235
  Columns, Gardner-Denver 415
  Conveyor Couplings, Link-Belt 370
  Extractors, Ezy-Out 216
  Jacks, Joyce 456
  Jacks, Simplex 459
  Pitch Gages, Lufkin 265
  Plates, Little Giant 259, 260
  Punches, Steel 303
  Slotting Cutters 223
  Stock, S. A. E. 21
Screwdrivers, Crescent 285
  Millers Falls 284
  S & H 285
  Stanley 270, 284
Screwed Fittings, Brass 148, 149
  Fittings, Cast Iron, Extra Heavy 138, 141
  Fittings, Cast Iron, Standard 138–141
  Fittings, Cast Iron, Weights of 138
  Fittings, Drop-Forged Steel, Vogt 125
  Fittings, Malleable Iron, Crane 141
  Fittings, Malleable Iron, Standard 143–145
  Fittings, Malleable Iron, Weights of 143
Screw-Geared Chain Hoists, Yale 448
Screws, Cap 44
  Clamp, Machinists', Armstrong 235
  Lag, Pipe Hanger 151
  Long 145
  Machine 46
  Set 44, 45
  Thread-Forming 46
  Thumb, Malleable Iron 46
  Wood 47
Scribers, Lufkin 267
Scroll Band Saws, Yates-American 319
  Lathe Chucks, Cushman 229
Sea Ring Packing 378
Sealing Compound, Joint 258
Seamless Brass Pipe 18
  Copper Pipe 18
  Copper Tubing 18
  Steel Boiler Tubes 59
  Steel Fittings, Welding, Taylor Forge 126, 127
  Steel Tubing 567
Sectional Pipe Covering 183, 184
Sections, Brush, Wheel, Wire, U. S. 239
  Extension, Valve Box 157
Self-Locking Elastic Stop Nuts 40
Semi-Finished Nuts 39
Sensitive Drills, Champion 316
Separator Magnets, C-H 368

S Page
Separator Pulleys, Magnetic, C-H 368
Separators, Cage Type, Strong 122
  Water and Oil, Spray Gun 508
Service Boxes 159, 160
  Cocks, Gas 104
  Pipe Connections, Copper, Hays 166
  Pipe Fittings, Copper, Hays 166–168
Set Hammers, Blacksmiths' 471
  Screw Wrenches 45
  Screws 44, 45
  Works, Saw Mill, Howell 462
Sets, Bit, Auger, Irwin 290
  Combination, Lufkin 266
  Drill, Mechanics' 210
  Drill, Twist 210, 211
  Drill and Countersink, Combined, Cleveland 210
  Maintenance, Simplex 459
  Mandrel, Expanding, Knock-Out 225
  Reamer, Adjustable, Cleveland 215
  Regulating, Spray Gun, Imperial 508
  Rivet 472
  Saw, Disston 295
  Saw, Stearns 295
  Screw Extractor, Ezy-Out 216
  Test, Blowpipe, Braun 584
  Welding Accessory 477
  Wrench, Socket, Williams 276, 277
Sewer Rings and Covers 162
Shackles, Anchor 53
  Chain 53
Shaft Boxes, Flat, Dodge 351
  Collars, Dodge 348, 349
  Couplings, Dodge 349
  Couplings, Dodge-Shaw 349
  Couplings, Falk 350
  Couplings, L-R 351
  Hanger Bearings, Dodge-Timken 356
  Hangers, Drop, Dodge 355
  Hangers, Post, Dodge 355
  Keyseaters, Burr 309
  Pillow Blocks, Dodge 351–353
  Pillow Blocks, Dodge-Timken 353, 354
  Post Bearings, Dodge 355
  Solid Journal Bearings, Dodge 351
Shafting, Horse Power of 22, 592
  S.A.E. 21
  Steel 21, 22
Shafting Information 592
Shafts, Drive, Pipe Machine, Toledo 251
Shakers, Sieve, Testing, Ro-Tap 581
Shanks, Saw, Hoe 294
Shaper Tools, Armstrong 231
Shapers, Yates-American 322
Sharpening Tools, Hand, Waugh 418
Shear-Cut Production Saws, Racine 299
Shears, Bar Cutting, Edwards 304
  Metal, Edwards 304
  Metal, Marvel 304
  Metal, Pels 306
  Metal, Throatless 307
  Plate, Metal, Pels 306
  Punches and Cutters, Combined, Pels 305
  Splitting, Marvel 304
  Squaring, Foot, Niagara 306
  Squaring, Power 306
  Throatless 307
Shears and Punches, Combined, Little Giant 306
Sheaves, Bicycle Spoke 440
  Curve, Card 441
  Knuckle, Card 441
  Multiduty 336
  Rope, Card 439, 441
  V Belt 336

S Page
Sheaves, Wire Rope 445
Sheet Gages, Starrett 266
  Insulation 181
  Millboard, Asbestos 182
  Packing 376
  Roofing Fasteners 26
Sheets, Brass 490
  Copper, Cold Rolled 18
  Copper, Hot Rolled 18
  Copper Amalgam 15
  Lead 490
  Nickel Silver 19
  Spring, Phosphor Bronze 19
  Steel, Black 11, 12
  Steel, Copperoid 15
  Steel, Galvanized 13–16
  Steel, Hot Rolled 10, 11
  Steel, Stainless 17
  Steel, Yoloy 15
  Zinc 16
Shell End Mill Arbors, Cleveland 221
  End Mills 221, 223
  Reamer Arbors, Cleveland Peerless 217
  Reamers, Cleveland 216
  Reamers, Cleveland Peerless 216
  Tool Arbors, Cleveland 217
Sherman Couplings, Hose 386
  Menders, Hose 386
Shields, Expansion 48
  Inspectors', Westinghouse 478
  Observation, Westinghouse 478
Shift Bosses Sample Picks 430
Shim Stock 19
Shingle Nails 26
Ship Augers 290
Shoe Nails, Horse 474
  Rasps 249
Shoes, Ladder 501
  Mule, Phoenix 474
  Pile 410
Shovel Handles 428
Shovels, Mechanical 566
  Power, Northwest 393
  Scoops, and Spades 423–427
Shuts, Cold 52
Shutters, Automatic, Ilg 499
Siamese Connections 389
Siamese and Sill Cocks, Combination 389
Side Chisels 472
  Milling Cutters 222
  Tools, Lathe, Armstrong 230
Siding, Steel, Corrugated 16
Siegelite Sheet Packing 376
Sieve Shakers, Testing, Ro-Tap 581
Sieves, Testing, Tyler 581
Sight-Feed Lubricators, Lunkenheimer 199
Silent Chain Drives, Link-Belt 359
Sill Cocks 169
  Cocks and Siamese, Combination 389
Silver Foil 585
  Solder 490
Silverlink Roller Chain, Link-Belt 359
Silverstreak Silent Chain, Link-Belt 359
Simplex Braces, Timber 458
  Braces, Trench 458
  Jacks 457–459
  Maintenance Sets 459
Single Bit Axes 468
Sinkers, Pneumatic 414
Sinking Pumps, Cameron 550
Siphons, Gauge, Steam 111
Siquad Bin Gates 397
Sixe's Maximum-and-Minimum Registering Thermometers 115
Sizes, Drill, Tap 220, 592
Sizing Tools, Tubing, Chase 165

S

Page

- **Skid** Platforms 513
- **Skimmers**, Power, Northwest 393
- **Skinner** Reseaters 95, 96
- **Skins**, Chamois 205
- **Skip** Trucks 562
- **Skips**, Ore 561
  - Self-Dumping 561
  - Water 561
- **Skroo-Zon** Handles, File 250
- **Skullgards**, M.S.A. 522
- **Slab** Saws, Howell 465
- **Slating Nails** 25
- **Sledge** Handles 271
- **Sledges**, Blacksmiths' 472, 473
  - Non-Sparking 270
  - Stone 473
- **Sleeve** and Wire Clamps, Klein 284
- **Sleeves**, Asbestos 524
  - Cast Iron, Water Main 152, 153
  - Drill, Keystone 212
  - Drill, Square Shank 212
  - Drill, Use-Em-Up 212
  - Fireproofed Duck 524
  - Leather 524
  - Tapping, Rensselaer 155
- **Slicker** Jackets 523
  - Overall Pants 523
- **Sling** Chains 51, 52
  - Psychrometers, Taylor 113
- **Slip** Hooks 53
- **Slitting** Saws, Metal 296
- **Slope** Rollers 440, 441
- **Slotted** Nuts, Semi-Finished 39
- **Slotting** Cutters, Screw 223
- **Sluice** Box Lining 579
- **Smelter** Brooms 511
- **Smoke** Masks, Willson 527
  - Stacks 176
- **Smooth** Box Nails 25
  - Foundry Nails 25
- **Smooth-On** Iron Cement 177
- **Snatch** Blocks, Manila Rope 444
  - Blocks, Wire Rope 445
- **Snips**, Circular, Crescent 303
  - Metal 303
  - Tinners' 303
- **Snyder** Coats 523
  - Gloves 523
  - Jackets 523
  - Pants, Overall 523
- **Soapstone** Pencils 273
- **Socket** Wrenches, Favorite 277
  - Wrenches, Williams 276–279
- **Sockets**, Drill, Twist 212
  - Drill, Use-Em-Up 212
  - Ring, Pipe, Grinnell 151
  - Wire Rope 438
  - Wrench, Williams 279
- **Soda**, Caustic 238, 585
- **Soda Ash** 238, 585
  - Bicarbonate 585
- **Sodium** Cyanide 585
  - Sulphide 585
- **Soft** Copper Wire 19
- **Solder**, Bar 490
  - Silver 490
  - Wire 490
- **Solder** Pots, Electric, Westinghouse 492
- **Soldering** Copper Handles 494
  - Coppers 494
  - Furnaces, C & L 493
  - Irons, American Beauty 494
  - Paste, Nokorode 490
  - Salts, Allen 491
  - Salts, Nokorode 491
- **Solid** Bushings, Cast Iron 491
  - Copper Hammers 474
  - Journal Bearings, Shaft, Dodge 351
  - Pulleys, Cast Iron 341
  - Woven Cotton Belting 327
- **Solution** Scales 517

S

Page

- **Solvent**, Rust, Dixon 503
- **Sonderglass** Gauge Glasses 110
- **Spades**, Scoops and Shovels 423–427
- **Spanners**, Hose 389
- **Specials** for Cast Iron Pipe, Water Main 152, 153
- **Specifications**, Handle, Federal 271
  - Steel, S.A.E. 20
- **Spectacle** Type Goggles 526
- **Speed** Indicators, Starrett 262
  - Indicators, Veeder-Root 262
  - Information 589
  - Lathes, Yates-American 320
  - Reducers, Falk 356, 357
- **Speed** and Pressure Regulators, Gardner-Denver 194
- **Speedbor** Bits, Electricians' 290
- **Speedsters**, Jones 321
- **Spigots** and Flanges, Cast Iron, Water Main 153
- **Spike** Bars, Coal Mine 431
  - Mauls 431
- **Spikes**, Flat Head 25
  - Oval Head 25
  - Track 53
- **Spiral** Conveyor Information 373
  - Conveyors 370
  - Packing 377, 379
  - Pipe, Taylor Forge 66
  - Ratchet Screwdrivers, Millers Falls 284
- **Splice** Bars 53
- **Split** Pulley Dimensions, Steel, Dodge 340
  - Pulleys, Cast Iron 341
  - Pulleys, Steel, Dodge 338–340
- **Splitting** Shears, Marvel 304
  - Shears, Punches and Cutters, Combined, Pels 305
- **Sponges** 205
- **Spool** Wire 19
- **Spot** Facers and Counterbores, Cleveland 213
- **Spray** Dust Respirators, Imperial 508
  - Gun Feed Cups, Imperial 508
  - Guns, Imperial 506–508
  - Nozzles, Hose 390
  - Outfits, Power, Myers 510
  - Painting Equipment, Imperial 506–510
  - Painting Outfits, Imperial 506, 507
  - Towers, Schubert-Christy 173
- **Spraying** Equipment, Metal 495
  - Machines, Imperial 506, 507
- **Spring** Cotters 42
  - Cutting-Off Tools, Lathe, Armstrong 230
  - Joint Rules, Lufkin 268
  - Scales 516
  - Sheets, Phosphor Bronze 19
  - Steel 23, 24
  - Toggles, Diamond 49
  - Tool Steel 24
- **Springs**, Coil 42
  - Compression 42
  - Extension 42
  - Lamp, Justrite 520
- **Sprinkler** Heads, Lawn 390
- **Sprinklers**, Hose 390
- **Sprocket** Rims, Valve Wheel, Babbitt 72
  - Wheel Cutters 224
  - Wheel Information 360
  - Wheels, Link-Belt 360
- **Spuds**, Bark 467
- **Spun** Oakum 155
- **Spur** Gears, Cast Iron 358
- **Spur-Geared** Chain Hoists, Yale 446, 447
  - Trolley Hoists, Yale 451
- **Square** Stakes, Pexto 308
- **Squares**, Combination, Lufkin 266

S

Page

- **Squares**, Double, Lufkin 265
  - Steel, Stanley 270
- **Squaring** Shears, Foot, Niagara 306
  - Shears, Power 306
- **Squibs**, Electric, Du Pont 419
  - Safety, Miners', Du Pont 419
- **Stack** Paint 181
- **Stacks**, Smoke 176
- **Stainless** Rules, Lufkin 267
  - Steel Sheets 17
- **Stair** Landing Fittings, Malleable Iron 146
- **Stakes**, Beakhorn, Pexto 308
  - Blow Horn, Pexto 308
  - Coppersmiths', Pexto 308
  - Hatchet, Pexto 308
  - Mandrel, Pexto 308
  - Square, Pexto 308
  - Tinners', Pexto 308
- **Stamps**, Hand, Steel 272
- **Standard** Tool Steel Classification 24, 233
- **Standards**, Gage, Wire 31
- **Standpipe** Siamese Connections 389
- **Stands**, Drill 311
  - Floor, Valve, Walworth 72
  - Polishing, Clizbe 246
  - Switch, Ground Throw 54
  - Switch, Malone 54
  - Switch, Parallel-Throw 55
  - Tank, Tabasco Heater 172
- **Stanley** Bars, Pry 270
  - Chisels, Cold 270
  - Chisels, Diamond Point 270
  - Hammers, Ball Pein 270
  - Hammers, Riveting 473
  - Hammers, Scaling 270
  - Non-Sparking Tools 270
  - Picks 270
  - Screwdrivers 270, 284
  - Sledges, Non-Sparking 270
  - Squares, Steel 270
- **Staples**, Fence, Wire 28
  - Hasp, Hinge 503
- **Staples** and Hasps, Steel 503
- **Star** Drilling Machines, Water-Well 392
  - Drills, Diamond 49
- **Starrett** Gages, Drill and Wire 266
  - Gages, Plate 266
  - Gages, Sheet 266
  - Gages, Tap and Drill 266
  - Gages, Wire 266
  - Indicators, Speed 262
- **Stay** Rods 37
- **StayBolt** Taps, Winter Bros 219
- **Staybolts**, Boiler 36
- **Stays**, Fence 29
- **Steam** Cocks, Brass 104
  - Cocks, Ground Key 108
  - Cocks, Iron 105
  - Engines, Erie 185
  - Engines, Murray 188
  - Engines, O. & S. 186
  - Gauge Cocks 108
  - Gauge Siphons 111
  - Hoists, Vulcan 553
  - Hose, Metallic, Flexible 384, 385
  - Hose, Rubber 382
  - Hose Couplings 388
  - Information 59
  - Pile Hammers 410
  - Pipe 61, 62
  - Pumps 530, 531
  - Traps, Morehead 118
  - Traps, Strong 119
  - Turbines, Coppus 187
  - Whistles, Lunkenheimer 107
- **Stearns** Sets, Saw 295
- **Steel**, Bessemer 6, 23
  - Cold Drawn 21
  - Cold Finished 21, 22

S — Page

Steel, Drill 23
  Drill, Hollow 416
  Fabricated 8
  Forging 23
  Grizzly 8
  Machinery 23, 24
  Mild 5–8
  Open Hearth 5–8
  Pick 24
  Rock Bit, Timken 416
  Sheet, Black 11, 12
  Sheet, Copperoid 15
  Sheet, Galvanized 13–16
  Sheet, Hot Rolled 10, 11
  Sheet, Stainless 17
  Sheet, Yoloy 15
  Spring 23, 24
  Structural 78
  Tool 24
  Tool, Rex 233
  Yoloy 15
Steel Angles 7
  Bands 6
  Bars, Bessemer 6
  Bars, Cold Drawn 21
  Bars, Cold Finished 21, 22
  Bars, Grizzly 8
  Bars, Mild 5–8
  Bars, Open Hearth 5–8
  Boiler Tubes, Seamless 59
  Channels 7, 8
  Classification, Tool, Standard 24, 233
  Figures 272
  Fittings, Forged, Welding, Taylor Forge 127–129
  Fittings, Screwed, Vogt 125
  Fittings, Seamless, Welding, Taylor Forge 126, 127
  Hoops 6
  I-Beams 8
  Letters 272
  Manufacturing Tolerances 21
  Pipe, Protected, Water System 67
  Plates 9
  Rails 53
  Roofing, Corrugated 16
  Rules, Lufkin 267, 268
  Shafting 21, 22
  Sheets, Black 11, 12
  Sheets, Copperoid 15
  Sheets, Galvanized 13–16
  Sheets, Hot Rolled 10, 11
  Sheets, Stainless 17
  Sheets, Yoloy 15
  Siding, Corrugated 16
  Specifications, S.A.E. 20
  Split Pulley Dimensions, Dodge 340
  Split Pulleys, Dodge 338–340
  Studs 37
  Studs, Taylor Forge 129
  Tees 8
  Treatment Extras 21
  Tubing, Seamless 567
  Wool 238
  Zees 7
Stems, Hose, Air 386
Step Ladders 501
Sterilized Lath Nails 28
Sterling Pumps 541
Stills, Water, Barnstead 578
Stillson Wrenches, Pipe 281
Stock, Screw, S.A.E. 21
  Shim 19
Stock Fence 30
Stocking Gear Cutters 225
Stocks, Die, Little Giant 260, 261
Stocks and Dies, Pipe, Armstrong Bros. 257
  Pipe, Toledo 256, 257
  Screw, Little Giant 259, 260
Stokers, Mechanical 173

S — Page

Stone, Pumice 238
  Rotten 238
Stone Forks 429
  Sledges 473
  Wire, Annealed 31
Stones, Axe, Norton 239
  Combination, India 238
  Grind, Mounted 246
  Grind, Unmounted 239
  Jointer, Yates-American 239
  Oil, Norton 238, 239
  Oil, Yates-American 239
Stop Couplings, Corporation, Hays 167
  Nuts, Elastic, Self-Locking 40
Stopers, Pneumatic 414
Stops, Compression, Scott 169
  Corporation, Hays 166, 167
  Curb, Hays 167, 168
  Gas, Iron Body, Walworth 105
  Gas Service 104
  Hays 168
  Hexo 168
  Hydrant 168
  Oil Country, Iron, Walworth 104
  Patent Guard 168
  Signet 169
  Steam, Brass 104
  Steam, Iron 105
Stops and Drains, Compression, Scott 169
  Hays 168
  Hexo 168
  Hydrant 168
  Patent Guard 168
  Signet 169
Storage Battery Locomotives 565
  Battery Testers 117
  Tanks, Galvanized Steel 549
  Tanks, Pressure, Goulds 549
  Tanks, Wood 548
Storm Sewer Rings and Covers 162
Stove Bolt Nuts 39
  Bolt Taps, Winter Bros. 218
  Bolts 34
  Pipe 497
  Pipe Elbows 497
  Pipe Wire 31
Stoves, Heating, Ajax 497
Straight Link Chain 51
Straightening Jacks, Pole, Simplex 458
Straightway Valves, Lunkenheimer 93
Strainers, Hose 123
  Pipe 123
  Suction, Fisher 123
Strand, Galvanized 437
Strap Hinges 504
Strapping, Box 273
Straps, Pipe 151
Street Washers, National 157, 159
Stretchers, Army Type 529
  Bullard 529
Striking Hammers 473
Strong Regulators, Pressure 98
  Separators, Cage Type 122
  Traps, Steam 119
  Traps, Vacuum 119
  Valves, Reducing 100
Structural Rivets 41
  Steel 7, 8
  Wrenches, Armstrong 276
Stub Ends, Van Stone, Welding, Taylor Forge 127
Studs, Steel 37
  Steel, Taylor Forge 129
Sucker Rod Couplings 547
Suction Hose 384
  Pipe Strainers, Clearflow 123
  Pumps, Diaphragm, Goulds 545
  Pumps, Lamp, Coleman 500

S — Page

Suction Strainers, Fisher 123
  Tees, McDaniel 121
Sulphate, Copper 585
Sulphide, Sodium 585
Sulphur 238
Sump Pumps 540, 541
Superector Wrenches, Williams 279
Superintendents' Lamps, ITP 518
  Lamps, Justrite 519
Supersocket Wrenches, Williams 276–278
Supports, Pipe, Grinnell 150
  Roller, Toledo 287
Surface Gages, Lufkin 264
  Grinders, W. & M. 244
Surface-Hardening Compound 475
Surfacers, Concrete, Berg 408
  Yates-American 323
Surfacing Mortar 179
Sutton Driers, Sand 409
Swage Bar Hammers, Disston 295
  Blocks, Cast Iron 470
Swages, Blacksmiths' 471
  Saw, Disston 295
Sweat Fittings, Copper, Chase 164, 170, 171
Swing Joints, Brass, Lunkenheimer 103
  Joints, Brass, Walworth 103
Swinging Belt Tighteners, Medart 356
Switch Stands, Ground Throw 54
  Stands, Malone 54
  Stands, Parallel-Throw 55
Switches, Cutoff, Low-Water, McDonnell 103
Swivel Head Cutters, Porter 282
Swivels, Chain 52
  Forged Steel 52
  Malleable Steel 52
Syphons, Gauge, Steam 111
Systems, Water 543, 544

T

T Hinges 504
Tabasco Heaters 172
Tables, Saw, Jones 321
Tachometers, Hand, O-Z 262
Tackle Blocks, Manila Rope 443
  Blocks, Wire Rope 444
Tailings and Sand Pumps, Kimball-Krogh 551
Take-About Sanders, Porter-Cable 318
Take-Ups, Dodge 368
  Robins 365
Tallies, Hand, Durant 262
Tallow Pots 203
Tamp Drills, Copper Head 420
Tampers and Scrapers, Copper Head 420
Tank Bottom Matting 381
  Capacity Information 591
  Fasteners, Tecktonius 549
  Stands, Tabasco Heater 172
Tanks, Heater, Tabasco 172
  Oil, Redwood 548
  Pressure, Gardner-Denver 415
  Pump, Fire, Accurate 577
  Storage, Galvanized Steel 549
  Storage, Pressure, Goulds 549
  Storage, Wood 548
  Water, Redwood 548
Tap Drill List, Pipe 220
  Drill Sizes 220, 592
  Extractors, Walton 217
  Wrenches, GTD 219, 220
Tap and Drill Gages, Starrett 266
Tape, Gasketing 380
Tape Rules, Lufkin 269
Taper Bridge Reamers, Cleveland 215
  Pin Reamers, Cleveland 216

T Page

Taper Pins 36
Tapers, Brown & Sharpe 587
  Morse 587
Tapes, Measuring, Lufkin 269
Tapping Chucks, Errington 227
  Machines, Allen 228
  Machines, Alto 228
  Machines, Mueller 154
  Sleeves, Rensselaer 155
  Valves, Rensselaer 155
Taps, Boiler, Winter Bros 219
  Hand, Winter Bros 218
  Machine Screw, Winter Bros 218
  Nut, Winter Bros 219
  Pipe, Winter Bros 219
  Stay Bolt, Winter Bros 219
  Stove Bolt, Winter Bros 218
Taps and Dies, Little Giant 259, 260
Tar, Coal 585
Tar Rakes 429
Taylor Anemometers 113
  Barometers 113
  Compasses 117
  Controllers, Temperature 118
  Gauges, Recording 114
  Humidiguides 115
  Psychrometers 113
  Thermoguides 115
  Thermometers 114–118
Taylor Forge Couplings, Pipe 65
  Fittings, Forged Steel, Welding 127–129
  Fittings, Seamless Steel, Welding 126, 127
  Flanges, Blind, Forged Steel 129
  Flanges, Companion, Forged Steel 129
  Flanges, Van Stone, Forged Steel 128
  Flanges, Welding 128
  Pipe, Spiral 66
  Stub Ends, Van Stone, Welding 127
  Studs, Steel 129
  Unions, Flange, Forged Steel 128
Tecktonius Fasteners 549
Tee Posts 29
Tees, Brass, Screwed 148
  Cast Iron, Flanged, Extra Heavy 134, 135
  Cast Iron, Flanged, Spiral Pipe 130
  Cast Iron, Flanged, Standard 130, 131
  Cast Iron, Screwed, Extra Heavy 138
  Cast Iron, Screwed, Standard 139
  Cast Iron, Water Main 152, 153
  Copper, Sweat, Chase 170
  Drop-Forged Steel, Screwed, Vogt 125
  Malleable Iron, Ammonia 124
  Malleable Iron, Railing 146
  Malleable Iron, Screwed, Crane 141
  Malleable Iron, Screwed, Standard 144
  Pipe, Dayton 65
  S.A.E., Imperial 171
  Seamless Steel, Welding, Taylor Forge 126
  Steel 8
  Suction, McDaniel 121
  Union, Malleable Iron 148
Telescoping Gages, Lufkin 264
Telsmith Breakers, Primary 399
  Crushers, Gyrasphere 399
  Crushing, Loading and Screening Plants 400
  Gates, Bin 397
  Grizzlies 398
  Plate Feeders 397
  Screens, Dry 401
  Washers, Hercules 401
Telsmith-Wheeling Crushers, Jaw 400

T Page

Temperature Controllers, Taylor 118
Templates, Tube, Chase 165
Templates for Drilling Flanged Valves and Fittings, Cast Iron, Extra Heavy 134
  for Drilling Flanged Valves and Fittings, Cast Iron, Standard 134
Test Gauges, Crosby 113
  Pumps, Hydraulic, Goulds 156
  Pumps, Inspectors', Crosby 111
  Sets, Blowpipe, Braun 584
Testers, Battery, Storage 117
  Dead Weight, Crosby 111
  Linen 577
Testing Sieve Shakers, Ro-Tap 581
  Sieves, Tyler 581
Thawing Torches, Aeroil 409
Thermo Battery Testers 117
Thermoguides, Taylor 115
Thermometers, American 117
  Angle Stem, American 117
  Angle Stem, Taylor 116
  Bake-Oven, Taylor 118
  Cup-Case, Taylor 115
  Dairy, Taylor 115
  Etched-Stem, Taylor 115
  Metal Case, Taylor 117
  Recording, Taylor 114
  Refrigerator, Taylor 118
  Registering, Maximum-and-Minimum, Taylor 115
  Straight Stem, American 117
  Straight Stem, Taylor 116
  Taylor 114–118
  Wall 117
  Window 117
Thickness Gages, Lufkin 265
  of Leather Belting 325
Thimbles, Wire Rope 438
Thinner, Paint 181
Thompson Heads, Sprinkler 390
  Sprinklers 390
Thread Dimensions, Basic 220, 587
  Information 587
Thread-Cutting Oil 502
Thread-Forming Screws 46
Threading, Pipe 61
Threading Machines, Pipe, Oster 252, 254
  Machines, Pipe, Oster-Williams 254
  Machines, Pipe, Toledo 250, 251
  Machines, Pipe, Williams 253, 255
  Machines, Pipe and Bolt, Tom Thumb 252
  Tool Cutters, Lathe, Armstrong 232
  Tools, Lathe, Armstrong 232
  Tools, Pipe, Armstrong Bros 257
  Tools, Pipe, Toledo 256, 257
Three-M Compound, Lapping and Grinding 237
  Paper 236
Three-M-ite Cloth 236
Throatless Shears 307
Thumb Screws, Malleable Iron 46
  Nuts 40
Ticonderoga Graphite, Flake 502
Tie Wedges 468
Ties, Bale, Hay 31
  Mine, Bethlehem Steel 54
  Wire 28
Tighteners, Belt, Swinging, Medart 356
Tiller Rope 436
Timber Braces, Simplex 458
  Carriers 467
Timers, Tyler 581
Timken Bits, Rock Drill 416
Tinners' Bench Plates, Pexto 308
  Formers, Roll, Pexto 307
  Forming Machines, Pexto 307
  Mallets 474

T Page

Tinners' Rivets 42
  Snips 303
  Stakes, Pexto 308
Tip Cleaners, Justrite 520
  Reamers, Lamp, Justrite 520
Tips, Burner, Lamp, Justrite 520
Toggle Bolts, Diamond 49
Toggles, Spring, Diamond 49
Toledo Die Heads 256
  Drives, Power 251
  Mounts, Vise 287
  Oil, Thread-Cutting 502
  Pipe Machines 250, 251
  Reamers, Pipe 217
  Rock Drill Rod Machines 417
  Shafts, Drive, Pipe Machine 251
  Stocks and Dies, Pipe 256, 257
  Supports, Roller 287
  Torches 500
  Vises, Pipe 287
Tolerances, Manufacturing, Steel 21
Tom Thumb Pipe and Bolt Machines 252
Tongs, Blacksmiths' 472
  Bolt 472
  Clinch 472
  Crucible 583
  Curved Lip 472
  Fittings, Williams 282
  Gad 472
  Horseshoers' 472
  Pipe, Williams 282
  Rail 56
  Rivet 472
  Straight Lip 472
Tool Bits, Mo-Max 234
  Holder Bits, Rex 233, 234
  Holder Cutters, Lathe, Armstrong 233, 234
  Holders, Boring, Armstrong 231
  Holders, Carbide, Lathe, Armstrong 230
  Holders, Lathe, Armstrong 229–232
  Posts, Lathe, Armstrong 232
  Room Checks, Brass 273
  Steel 24
  Steel, Rex 233
  Steel Classification, Standard 24, 233
Toolmakers' Parallel Clamps, Lufkin 266
Tools, Beading, Mound 285
  Bending, Copper Tube, Chase 165
  Boring, Lathe, Armstrong 231
  Calking, Cinch 47
  Cutting-Off, Lathe, Armstrong 230
  Drive, Lubricating System, Alemite 197
  Electric, Portable 310–316
  End, Fence 28
  Flanging, Copper Pipe, Hays 165
  Grinder, Diamond 244
  Knurling, Lathe, Armstrong 232
  Lathe, Armstrong 229–233
  Machine 304A–304D
  Non-Sparking, Stanley 270
  Packing, Pilley 285
  Parting, Yates-American 272
  Planer, Armstrong 231
  Pneumatic 413, 414
  Reseating, Skinner 95, 96
  Scraping, Pilley 285
  Shaper, Armstrong 231
  Sharpening, Hand, Waugh 418
  Side, Lathe, Armstrong 230
  Sizing, Tubing, Chase 165
  Threading, Lathe, Armstrong 232
  Tying 28
Torch Burners, C & L 494
Torches, Blow, C & L 493, 494
  Blow, Turner 494
  Cutting 480–482
  Needle, C & L 493

T Page

- **Torches**, Thawing, Aeroil 409
  - Toledo 500
  - Welding 480–482
- **Tormay** Oilers 204
- **Torpedo** Cleaners, Tube, Boiler 57
- **Towers**, Spray, Schubert-Christy 173
- **Track**, Steel, Saw Mill, Howell 461
- **Track** Bolts 53
  - Chisels 431
  - Drills 56
  - Gauges 56
  - Jacks, Simplex 457
  - Levels 56
  - Punches 431
  - Rollers 440, 441
  - Rope Rollers 440
  - Spikes 53
  - Wrenches 56
- **Trackmen's** Adzes 431
- **Tractor** Saw Attachments 466
- **Tractors**, Linn 396
- **Trainers**, Belt, Robins 364
- **Transits**, Pocket, Brunton 578
- **Transmission** Belting 326, 327
  - Rope, Manila 442
- **Traps**, Steam, Morehead 118
  - Steam, Strong 119
  - Vacuum, Strong 119
- **Traveling** Cranes, I-Beam, Yale 451
- **Treatment** Extras, Steel 21
- **Trench** Braces, Simplex 458
- **Trimo** Cutters, Pipe 258
  - Pins, Pipe Cutter 258
  - Rollers, Pipe Cutter 258
  - Vises, Pipe 287
  - Wheels, Pipe Cutter 258
  - Wrenches, Pipe 280
- **Trip** Gongs 562
  - Jacks 457
- **Tripod** Magnifiers 577
- **Tripoli** Composition 238
- **Troemner** Scales 517
- **Trolley** Hoists, Detroit 453
  - Hoists, Yale 451
- **Trolleys**, Hoist, Yale 454
  - I-Beam, Yale 454
- **Troublemen's** Blocks, Klein 284
- **Trough** Conveyors, Porta 396
  - Countershaft Ends, Link-Belt 371
  - Ends, Conveyor, Link-Belt 372
  - Hangers, Link-Belt 371
  - Linings, Conveyor, Link-Belt 368
- **Troughing** Idlers, Dodge 367
  - Idlers, Dodge-Timken 367
  - Idlers, Robins 364
- **Troughs**, Conveyor, Link-Belt 369
- **Truck** Casters 514
  - Pedestals 564
  - Scales 515
- **Trucking** Snatch Blocks 445
- **Trucks**, Bag 513
  - Barrel 513
  - Card 562, 564, 565
  - Cotton 514
  - Factory 514
  - Freight-House 514
  - Grain 514
  - Lift, Hand 512, 513
  - Ore 562, 564, 565
  - Platform 514
  - Railroad 513
  - Skip 562
  - Wagon 514
  - Warehouse 513
- **Tube** Bending Tools, Copper, Chase 165
  - Cleaners, Boiler 57
  - Cutters, Wiedeke 58
  - Expanders, Wiedeke 58
  - Ferrules, Boiler 59
  - Fittings, Brass, Imperial 171
  - Flarers, Wiedeke 58

T Page

- **Tube** Plate Gaskets 379
  - Rollers, Wiedeke 58
  - Scrapers 57
  - Sizing Tools, Copper, Chase 165
  - Templates, Chase 165
- **Tubes**, Boiler, Bent 59
  - Boiler, Seamless Steel 59
  - Condenser 67
- **Tubing**, Cloth Inserted 386
  - Copper, Dehydrated 18
  - Copper, Seamless 18
  - Steel, Seamless 567
  - Ventilating, Mine 574
  - Water, Copper, Chase 164
- **Tubing** Cutters, Beaver 165
- **Tubular** Boilers 174, 175
  - Gasketing 379
- **Turbine** Generator Units, Westinghouse 187
  - Pumps 542
- **Turbines**, Steam, Coppus 187
  - Water 193
- **Turbo-Generators**, Fitz 192
- **Turnbuckles** 439
- **Turner** Coppers, Soldering 494
  - Torches, Blow 494
- **Turning** Chisels, Yates-American 272
  - Gouges, Yates-American 272
- **Turntables**, Card 55
- **Tuthill** Highway Guard 437
- **Tuyere** Irons, Champion 470
- **Twist** Drill Sets 210, 211
  - Drill Sockets 212
  - Drills, Bit Stock 210
  - Drills, Blacksmiths' 209
  - Drills, Bonding 207
  - Drills, Coe Shank 209
  - Drills, Large Shank 206
  - Drills, Letter Size 208
  - Drills, Long Set 207
  - Drills, Ratchet, Square Shank 209
  - Drills, Short Set 208, 209
  - Drills, Small Shank 206, 207
  - Drills, Square Shank 209
  - Drills, Straight Shank 207-211
  - Drills, Taper Shank 206, 207
  - Drills, Wire Gauge 208
  - Drills, Wood 209
- **Twisted** Packing, Gasoline Rod 378
  - Packing, Jute 155
  - Packing, Mogul 378
- **Tying** Tools 28
- **Tyler** Sieves, Testing 581
  - Timers 581

U

- **U.S.** Brushes, Wheel, Wire 239
- **U.S.G.** Graphite, Boiler 502
  - Graphite, Lubricating 502
- **U-W** Clips, Wire Rope 438
  - Cloth, Brattice 575
  - Shackles 53
  - Turnbuckles 439
- **Umeco** Benders, Rail 56
  - Punches, Rail 55
- **Underwriters'** Fire Hose 385, 386
  - Hose Pipes 390
- **Union** Axes 468
  - Couplings, S.A.E., Imperial 171
  - Elbows, Malleable Iron 148
  - Nuts, S.A.E., Imperial 171
  - Sanitary Clothes Hangers 524
  - Tees, Malleable Iron 148
- **Unions**, Brass 149
  - Copper, Sweat, Chase 171
  - Flange, Ammonia 24
  - Flange, Cast Iron, Extra Heavy 141
  - Flange, Cast Iron, Standard 141
  - Flange, Forged Steel 124

U Page

- **Unions**, Flange, Forged Steel, Taylor Forge 128
  - Flange, Malleable Iron, Standard 141
  - Forged Steel, Hydro 147
  - Forged Steel, Mark 147
  - Forged Steel, Petro 147
  - Ground Joint, Forged Steel 124
  - Hays 166
  - Malleable Iron, Hub 147
  - Malleable Iron, Walco 147
  - Malleable Iron, Walworth 147
- **Unit** Heaters, Ilg 498, 500
  - Packages, First Aid Kit 528
- **Units**, Power 189
  - Turbine Generator, Westinghouse 187
  - Turbo-Generator, Fitz 192
- **Universal** Lamps, Cap, Acetylene 519
- **Unmounted** Grindstones 239
- **Upright** Drills, Champion 316, 317
- **Upson** Bolts 35
- **Use-Em-Up** Sleeves, Drill 212
  - Sockets, Drill 212
- **Useful** Information 586–594

V

- **V** Belt Sheaves 336
  - Belts 333–335
- **Vacuum** Gauges, Crosby 112, 113
  - Pumps, Leiman 573
  - Traps, Strong 119
- **Vacuum** and Air Relief Valves, Combined McCracken 163
- **Valley**, Roll, Galvanized 17
- **Valve** Attachments, Pump, Reseater, Dexter 96
  - Boxes, Extension 157
  - Boxes, Hydrant 159
  - Cutters, Pump Seat, S & W 96
  - Discs, Non-Metallic, Lunkenheimer 79
  - Floor Stands, Walworth 72
  - Information 589
  - Leathers, Pump 546
  - Oilers 202
  - Reseaters, Dexter 96
  - Reseaters, Skinner 96
  - Weights, Brass 70
  - Weights, Ferrenewo 70
  - Weights, Iron 71
  - Weights, Iron Body 71
  - Wheel Sprocket Rims, Babbitt 72
- **Valves**, Air Adjusting, Imperial 509
  - Air Relief and Vacuum, Combined, McCracken 163
  - Altitude, Kieley 163
  - Angle, All Iron, Lunkenheimer 89
  - Angle, Brass, Lunkenheimer 79–85
  - Angle, Brass, Scott 169
  - Angle, Brass, Standard 85
  - Angle, Brass, Walworth 85–87
  - Angle, Iron Body, Lunkenheimer 89, 90
  - Angle, Iron Body, Walworth 91
  - Angle, Steel, Lunkenheimer 94
  - Auxiliary, Hydrant 159
  - Back Pressure, Davis 100
  - Back Pressure, Fisher 100
  - Balanced, Davis 101
  - Blow-Off, Everlasting 94
  - Blow-Off, Lunkenheimer 93, 94
  - Check, Brass, Angle, Lunkenheimer 87, 88
  - Check, Brass, Angle, Walworth 88
  - Check, Brass, Ball, Lunkenheimer 88
  - Check, Brass, Horizontal, Lunkenheimer 87, 88
  - Check, Brass, Horizontal, Walworth 88

V

Page

- **Valves**, Check, Brass, Lift, Lunkenheimer 87
  - Check, Brass, Swing, Lunkenheimer 88
  - Check, Brass, Swing, Scott 169
  - Check, Brass, Swing, Walworth 89
  - Check, Brass, Vertical, Lunkenheimer 87, 88
  - Check, Brass, Vertical, Walworth 88
  - Check, Iron Body, Angle, Lunkenheimer 91, 92
  - Check, Iron Body, Horizontal, Lunkenheimer 91, 92
  - Check, Iron Body, Horizontal, Walworth 92
  - Check, Iron Body, Swing, Lunkenheimer 92
  - Check, Iron Body, Swing, Walworth 93
  - Check, Iron Body, Vertical, Walworth 93
  - Check, Pump, Force Feed, McCullough 201
  - Check, S.A.E., Imperial 171
  - Corrosive Service, Lunkenheimer 72, 89
  - Cross, Brass, Lunkenheimer 80–84
  - Cross, Brass, Walworth 85
  - Cross, Iron Body, Lunkenheimer 89, 90
  - Expansion, Drop-Forged Steel, Ammonia, Vogt 95
  - Ferrenewo, Lunkenheimer 81, 89–91
  - Float, Davis 101
  - Foot, Clearflow 97
  - Foot, Iron Body 97
  - Gate, All Iron, Lunkenheimer 75, 77
  - Gate, Brass, Lunkenheimer 72–74
  - Gate, Brass, Scott 169
  - Gate, Brass, Walworth 74
  - Gate, Corrosive Service, Lunkenheimer 72
  - Gate, Drop-Forged Steel, Vogt 95
  - Gate, Hose, Brass 74
  - Gate, Iron Body, Lunkenheimer 74–76
  - Gate, Iron Body, Walworth 77, 78
  - Gate, Steel, Lunkenheimer 94
  - Globe, All Iron, Lunkenheimer 89
  - Globe, Brass, Lunkenheimer 79–85
  - Globe, Brass, Scott 169
  - Globe, Brass, Standard 85
  - Globe, Brass, Walworth 85–87
  - Globe, Corrosive Service, Lunkenheimer 89
  - Globe, Drop-Forged Steel, Vogt 95
  - Globe, Iron Body, Lunkenheimer 89, 90
  - Globe, Iron Body, Walworth 91
  - Globe, Steel, Lunkenheimer 94
  - High Duty, Brass, Lunkenheimer 85, 88
  - Hose, Brass 389
  - N-M-D, Lunkenheimer 79, 87
  - Needle, Brass, Lunkenheimer 84, 85
  - Needle, Steel, Lunkenheimer 94
  - Non-Return, Lunkenheimer 90
  - Plug, Lubricated, Walworth 106, 107
  - Pressure Reducing, Davis 100
  - Pressure Reducing, Fisher 99
  - Pressure Reducing Strong 100
  - Pressure Regulating, Davis 99
  - Pressure Regulating, Strong 98
  - Pump, Belmont 547
  - Quick-Operating, Brass, Lunkenheimer 79, 82
  - Reducing, Davis 100
  - Reducing, Fisher 99
  - Reducing, Strong 100

V

Page

- **Valves**, Regulating, Pressure, Davis 99
  - Regulating, Pressure, Strong 98
  - Relief, Altitude, Kieley 163
  - Relief, Lunkenheimer 97
  - Renewo, Brass, Lunkenheimer 81–84
  - Safety, Iron Body, Walworth 98
  - Safety, Pop, Lunkenheimer 98
  - Steel, Lunkenheimer 94
  - Straightway, Lunkenheimer 93
  - Tapping, Rensselaer 155
  - Water Works, Rensselaer 157
  - Whistle, Lunkenheimer 107
  - Y, Lunkenheimer 93
- **Van Stone** Flanges, Forged Steel, Taylor Forge 128
  - Stub Ends, Welding, Taylor Forge 127
- **Vanning** Plaques, Richards 578
- **Variety** Saws, Yates-American 321
- **Varnish** Brushes 511
- **Veeder-Root** Counters 262
- **Ventilating** Blowers, Coppus 568
  - Blowers, Ilg 569, 570
  - Fans, Champion 571, 573
  - Fans, Ilg 499
  - Tubing, Mine 574
- **Ventilators**, Roof, Ilg 499
- **Victor-Acme** Blowers 572
- **Vise** Mounts, Toledo 287
- **Vises**, Blacksmiths' 288
  - Drill Press, Greene 288
  - Garage, Columbian 287
  - Leg, Steel 288
  - Machinists', Columbian 286
  - Machinists', Parker 287
  - Milling Machine, Kearney & Trecker 288
  - Pipe, Columbian 287
  - Pipe, Combination, Columbian 287
  - Pipe, Toledo 287
  - Pipe, Trimo 287
  - Quick-Action, Greene 288
  - Woodworkers' Columbian 288
- **Vogt** Bends, Return, Malleable Iron, Ammonia 124
  - Fittings, Drop-Forged Steel, Screwed 125
  - Valves, Ammonia, Drop-Forged Steel 95
  - Valves, Expansion, Drop-Forged Steel 95
  - Valves, Gate, Drop-Forged Steel 95
  - Valves, Globe, Drop-Forged Steel 95
- **Volume** Blowers, Champion 571
  - Blowers, Ilg 571, 574
- **Vulcan** Anvils 471
  - Chain, Feed 50
  - Hoists, Electric 552, 553
  - Hoists, Gasoline 555
  - Hoists, Prospectors' 553
  - Hoists, Steam 553
  - Tongs, Pipe 282

W

- **W. & M.** Grinders, Surface 244
- **Wabash** Covers, Meter Box 162
- **Wagon** Scales 515
  - Trucks 514
- **Walco** Unions 147
  - Wrenches, Pipe 281
- **Walk** Gates 31
- **Wall** Brushes 511
  - Coating, Boiler 178
  - Thermometers 117
- **Walton** Extractors, Tap 217
- **Walworth** Bushings, Brass 149
  - Clamps, Pipe 156
  - Cocks, Gas, Iron Body 105

W

Page

- **Walworth** Cocks, Oil Country 104
  - Cocks, Steam, Brass 104
  - Cocks, Steam, Iron 105
  - Couplings, Brass 149
  - Couplings, Malleable Iron 145
  - Couplings, Wrought 145
  - Fittings, Brass 149
  - Flanges, Blind, Extra Heavy 137
  - Flanges, Blind, Standard 133
  - Flanges, Companion, Extra Heavy 137
  - Flanges, Companion, Standard 133
  - Joints, Expansion 103
  - Joints, Swing Brass 103
  - Locknuts, Malleable Iron 145
  - Plugs, Brass 149
  - Stands, Floor, Valve 72
  - Unions, Malleable Iron 147
  - Valves, Angle, Brass 85–87
  - Valves, Angle, Iron Body 91
  - Valves, Check, Brass 88, 89
  - Valves, Check, Iron Body 92, 93
  - Valves, Cross, Brass 85
  - Valves, Gate, Brass 74
  - Valves, Gate, Iron Body 77, 78
  - Valves, Globe, Brass 85–87
  - Valves, Globe, Iron Body 91
  - Valves, Plug, Lubricated 106, 107
  - Valves, Safety, Iron Body 98
  - Wrenches, Cock 104
  - Wrenches, Pipe, Parmelee 280
  - Wrenches, Pipe, Stillson 281
- **Warehouse** Brooms 511
  - Scales 515
  - Trucks 513
- **War-Mo** Picks 430
- **Warren** Chisels, Track 431
  - Hammers 473
  - Mauls, Spike 431
  - Sledges 472
  - Tongs 472
- **Warwood** Picks 430
- **Washer** Cutters 381
- **Washers**, Bibb 169
  - Cast Iron 43
  - Faucet 169
  - Glass, Gauge 111
  - Hercules, Telsmith 401
  - Hose 169
  - Hose, Rubber 388
  - Lock, Never Slip 43
  - Lock, Nut, Malleable Iron 43
  - Oil Cup, Lunkenheimer 199
  - Planer Head Bolt 323
  - Street, National 157
  - Wrought Iron 43
- **Washing** Pans, Gold 578
- **Waste**, Cotton 205
  - Wool 205
- **Waste** Cans, Oily 205
  - Nuts, Malleable Iron, Standard 145
- **Watchmen's** Clocks 575
- **Water** Bags, Desert 502
  - Buckets, Galvanized 501
  - Buckets, Mine 560
  - Dippers, Tin 501
  - Gauge Columns 110
  - Gauges, Lunkenheimer 109
  - Gauges, Self-Cleaning 109
  - Heaters, Hot 172
  - Hose, Metallic, Flexible 384
  - Hose, Rubber 382, 383
  - Hose Couplings 388
  - Information 593
  - Main Drilling Machines, Mueller 154
  - Main Fittings, Cast Iron 152, 153
  - Main Tapping Machines, Mueller 154
  - Meters 161
  - Pails, Galvanized 501
  - Pipe 61–64

W Page

Water Pipe, Cast Iron 152
  Skips 561
  Stills, Barnstead 578
  System Pipe 67
  Systems 543, 544
  Tanks, Redwood 548
  Tube Boilers, Murray 175
  Tubing, Copper, Chase 164
  Turbines 193
  Well Casing, Lap Welded 66
  Well Drilling Machines, Star 392
  Wheels 193
  Works Valves, Rensselaer 157
Water and Oil Separators, Spray Gun 508
Waterproof Glue 328
Waugh Collaring Machines 418
  Sharpening Tools, Hand 418
Wax, Paraffin 238
Ways, Balancing, Anderson 308
Wedges, Coal 567
  Grady 272
  Saw 469
  Tie 468
Weights, Black Sheets 11, 12
  Cast Iron Fittings, Screwed 138
  Cock 71
  Galvanized Sheets 13–16
  Malleable Iron Fittings, Screwed 143
  Pipe Insulation, Sectional 183
  Rubber Belting 325
  Steel, Cold Finished 22
  Valve, Brass 70
  Valve, Ferrenewo 70
  Valve, Iron 71
  Valve, Iron Body 71
Weights and Measures 588
Welders, Arc 476
Welding Accessory Sets 477
  Cable 477
  Compound 475
  Equipment and Supplies 480–488
  Fittings, Forged Steel, Taylor Forge 127–129
  Fittings, Seamless Steel, Taylor Forge 126, 127
  Flanges, Forged Steel, Taylor Forge 128
  Flux 484
  Glass 477, 479
  Goggles, Oxweld 479
  Goggles, Willson 479, 526
  Helmets 478, 479
  Rods 485–488
  Torches 480–482
  Van Stone Stub Ends, Taylor Forge 127
Well Casing, Lap Welded 66
  Casing, Steel 67
  Cylinders, Goulds 548
  Drilling Machines, Star 392
Westcott Wrenches, S, Adjustable 280
Westinghouse Glass, Welding 477
  Helmets 478
  Holders, Electrode 477
  Locomotives, Storage Battery 565
  Shields, Inspectors' or Observation 478
  Solder Pots 492
  Turbine Generator Units 187
Wheel Brushes, Wire, U. S. 239
  Dressers, Grinding 244
  Information 360
Wheelbarrow Scales, Portable 514
  Wheels 422
Wheelbarrows 422
Wheels, Car, Mine 564
  Cutter, Pipe 258
  Dewatering 373

W Page

Wheels, Disc, Pneumatic Tire 422
  Emery, American 240–243
  Grinding, American 240–243
  Polishing, Felt 239
  Sprocket, Link-Belt 360
  Water 193
  Wheelbarrow 422
Wheels and Axles, Carriage, Saw Mill, Howell 461
Wheels and Mine Fans, Disc, Champion 573
Whistle Valves, Lunkenheimer 107
Whistles, Chime, Lunkenheimer 107
  Steam, Lunkenheimer 107
Whitney Combinations, Angle Iron 304
  Punches 303
Wick Packing, Asbestos 381
  Packing, Candle 378
Wiedeke Cutters, Tube 58
  Expanders, Tube 58
  Flarers, Tube 58
  Rollers, Tube 58
Williams Nuts, Thumb 40
  Pipe Machines 253, 255
  Sockets, Wrench 279
  Tongs, Fittings 282
  Tongs, Pipe 282
  Wrenches, Non-Sparking 276
  Wrenches, Railroad 280
  Wrenches, Ratchet 279
  Wrenches, Safety 276
  Wrenches, Socket 276–279
  Wrenches, Superector 279
  Wrenches, Supersocket 276–278
Willson Glass, Welding 479
  Goggles 479, 525, 526
  Helmets 478, 479
  Masks, Fume and Smoke 527
  Respirators 526, 527
Winches, Hand 557
  Hoisting 557
  Prospectors' 557
  Pulling 557
Window Thermometers 117
Wing Nuts, Lamp, Justrite 520
  Nuts, Malleable Iron 40
Winslow Scales, Wheelbarrow 514
Winter Bros. Reamers, Pipe 219
  Taps, Boiler 219
  Taps, Hand 218
  Taps, Machine Screw 218
  Taps, Nut 219
  Taps, Pipe 219
  Taps, Stay Bolt 219
  Taps, Stove Bolt 218
Wiping Rags 205
Wire, Annealed 31
  Barbed 29
  Brace 31
  Connecting, Du Pont 420
  Copper, Soft 19
  Fence 31
  Fish, Electric 23
  Galvanized 31
  Guy 437
  Leading, Du Pont 420
  Metallizing, Metco 496
  Nickel Silver 19
  Phosphor Bronze 19
  Spool 19
  Stone, Annealed 31
  Stove Pipe 31
Wire Belt Lacing, Bristol 329
  Bench Brushes 510
  Brushes 510, 511
  Cable Carriage Drives, Saw Mill, Howell 460
  Casting Brushes 510
  Cloth 402–406, 505
  Dusting Brushes 510

W Page

Wire Fence 29, 30
  Fence Staples 28
  Gage Standards 31
  Gage Twist Drills 208
  Gages, Starrett 266
  Gear Brushes 510
  Grips, Crescent 284
  Grips, Haven 284
  Nails, Copper 25
  Nails, Polished 25–28
  Rope 432–437
  Rope Blocks 444, 445
  Rope Clips 438
  Rope Information 432
  Rope Preserver 437
  Rope Sheaves 445
  Rope Sockets 438
  Rope Thimbles 438
  Scratch Brushes 510, 511
  Screen Cloth 402–406
  Screen Goggles 526
  Solder 490
  Ties 28
  Wheel Brushes, U.S. 239
Wire and Drill Gages, Starrett 266
Wire and Sleeve Clamps, Klein 284
Wirt & Knox Reels, Hose 391
Wolf Lamps, Safety, Miners' 517
Wolverene Cutters, Bolt, Rivet and Nut 282
Wood Chisels, Crescent 285
  Rasps 248, 249
  Rod Couplings 547
  Screws 47
Woodruff Cutters, Keyseat 223
  Keys 348
Wood's Files 247
Woodworkers' Vises, Columbian 288
Wool, Lead 154
  Rock 182
  Steel 238
Wool Waste 205
Working Pressures, Wrought Pipe 590
Worthington Heaters, Feed Water 172
Wrench Sets, Socket, Williams 276, 277
  Sockets, Williams 279
Wrenches, Adjustable, Crescent 279
  Adjustable, Crestoloy 279
  Adjustable, Westcott 280
  Car, Armstrong 276
  Chrome Vanadium Steel, Armstrong 275
  Cock, Walworth 104
  Construction, Armstrong 275
  Drop Forged, Armstrong 274–276
  Engineers', Armstrong 274, 275
  Hydrant 389
  Non-Sparking, Williams 276
  Pipe, Erie 280
  Pipe, Parmelee 280
  Pipe, Ridgid 281
  Pipe, Stillson 281
  Pipe, Trimo 280
  Pipe, Walco 281
  Pipemaster, Erie 280
  Railroad, Williams' 280
  Ratchet, Favorite 277
  Ratchet, Williams 279
  S, Adjustable, Westcott 280
  Safety, Williams 276
  Set Screws 45
  Socket, Favorite 277
  Socket, Williams 276–279
  Structural, Armstrong 276
  Superector, Williams 279
  Supersocket, Williams 276–278
  Tap, GTD 219, 220
  Track 56
Wrought Nipples 142
  Pipe 61–64

X — Page

- **Xanthate** 585

Y

- **Y** Bends, Brass, Screwed 148
  - Bends, Malleable Iron, Screwed, Crane 141
  - Bends, Malleable Iron, Screwed, Standard 144
  - Branch Connections, Hays ..166, 167
  - Branches, Cast Iron, Flanged, Extra Heavy 135
  - Branches, Cast Iron, Flanged, Spiral Pipe 130
  - Branches, Cast Iron, Flanged, Standard 131
  - Branches, Cast Iron, Screwed, Extra Heavy 138
  - Branches, Cast Iron, Screwed, Standard 139
  - Branches, Cast Iron, Water Main 153
  - Valves, Lunkenheimer 93

Y — Page

- **Yale** Cranes, Traveling, I-Beam .. 451
  - Hoists, Chain 446–453
  - Hoists, Electric 452, 453
  - Hoists, Pul-Lift 450
  - Hoists, Trolley 451
  - Padlocks 504, 505
  - Platforms, Skid 513
  - Trolleys, Hoist 454
  - Trolleys, I-Beam 454
  - Trucks 512, 513
- **Yankee** Grinders, Drill 244
- **Yates-American** Bits, Chisel 291
  - Bits, Machine 291
  - Chisels, Hollow 291
  - Chisels, Mortising 291
  - Chisels, Turning 272
  - Gouges, Turning 272
  - Guides, Saw, Band 320
  - Jointers, Hand 319
  - Lathes, Speed 320
  - Mortisers, Hollow Chisel 322
  - Parting Tools 272

Y — Page

- **Yates-American** Routers 322
  - Rubbers, Band Saw Wheel 319
  - Sanders 322
  - Sanders and Grinders, Combined 317
  - Saws, Band, Power 319
  - Saws, Variety 321
  - Shapers 322
  - Stones, Jointer 239
  - Surfacers 323
- **Yokes**, Meter, Ford 161
- **Yoloy** Pipe 61
  - Steel 15
- **Youngstown** Copperoid Sheets 15
  - Pipe 61–64
  - Yoloy Steel Sheets 15

Z

- **Zees**, Steel 7
- **Zinc**, Sheet 16
- **Zinc** Dust 585

٨
٣